Successful Methods

CONSTRUCTION - ROAD MAKING - ENGINEERING - INDUSTRIAL - MINING

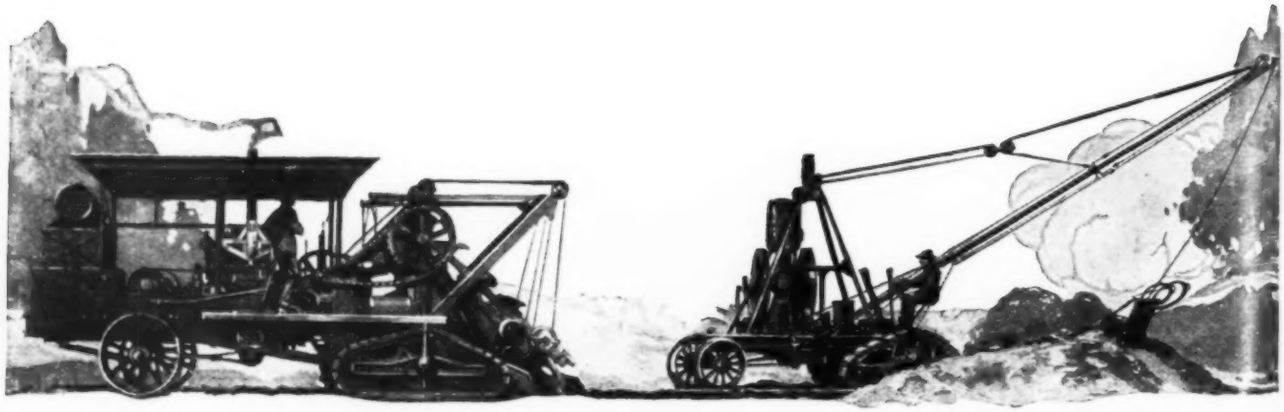
Let's Go!

Vol. 2 January 1920 No. 1

"From Start To Finish Of The New Year"

The
"Start To Finish Of The Trench"
People Here At Newton
Wish You Happiness And Prosperity
– All Of Us

The Parsons Company
Dec. 31. 1919



Successful Methods

A Magazine of Construction Service

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LET'S GO!

All right. But where?

The phrase, "Let's Go," originated in the army, but a soldier was not permitted to start without an objective,

What is ***our*** objective?

The construction man who cannot see the volume of work that must be done in 1920 is worse than blind.

Read in this issue the gigantic road building plans of the various states.

New dams, that we may further harness our water power; new sewers, that our communities may be more sanitary; new factories, that production may be speeded up and present demands supplied; new homes, that all may live decently;--- these are just a few items of the big construction program for 1920.

The necessary money is in hand; materials are available; machines that increase the work of men are ready. Nothing is lacking, except spirit and courage in the hearts of men to go ahead.

Let's stop thinking and talking about the world war and reconstruction problems.

Apply that all-efficient panacea for unrest and dissension---work.

"Let's Go" and produce.

Make that ***our*** slogan.

"Our" includes Successful Methods.

We're going to work hard for our readers, hand in hand with them in the construction field, to carry each month a real message of easier, better and more successful methods of how to do the job.

The New Year is at hand---a tremendous volume of work is to be done.

All together now---contractor, engineer, inspector, public official, Mr. Average Citizen, manufacturer, material man, foreman, laborer, and Successful Methods---let's go to work!

This Magazine Will Be Sent to Men Who Can Use It.

This Issue Has More Than 75,000 Circulation.

EDITORIALS

Here's Your Chance

TO some of our readers who never saw a road contract and are so firmly entrenched in some other branch of construction work that they never even hope to see one, it may seem as though this issue of SUCCESSFUL METHODS talks too much about roads and not enough of other construction. It may look to them as though road building were to be the only form of construction work in these United States from this time forth.

Not a word of truth in that assumption. As we say on the first page of this issue, we cannot go anywhere until we have an objective and that statement is just as true of a road as it is of anything else. Who ever heard of a road that didn't go somewhere? And that somewhere usually is a city or town. And in that city or town you will find buildings of all kinds—office buildings, factories, stores, theaters, homes and every form of shelter that man has devised.

In every city and town in the land, new buildings are going up now, and more new ones will be built during 1920. Every new road means new building construction in the cities which it connects or passes through. So when SUCCESSFUL METHODS talks about roads it is really talking about building construction, too.

But it isn't going to content itself with that. In the issues that follow will be material about other forms of construction than roads. And there will be plenty to talk about. Cleveland is building a new municipal auditorium that is said to be a wonder. There will be an article about that. In New York they are at work on the Gilboa Dam which will be a part of New York City's water system. SUCCESSFUL METHODS will tell about that too.

These are two typical articles that are being prepared now. There will be others and our readers can help us to get them. If you are doing a big building job, one that you are proud of through and through, tell your brother contractors and engineers about it through the columns of SUCCESSFUL METHODS. They are open to you. Why not take advantage of your opportunity?

Plenty of Room for More

YOU contractors who have steered clear of highway work because of unfamiliarity with conditions in that branch of the construction field may profit by reading an excerpt from the address delivered before the American Association of State Highway Officials at Louisville last month by the association's president, A. R. Hirst, State Highway Engineer of Wisconsin. Here is what he said:

"The contracting problem we always have with us. We need every competent highway builder available and we need immediately to multiply his number two to five times in the various states. We must encourage those good contractors who are now available and develop many new ones. To do this good prices will have to be paid and fair treatment given. On the other hand, we must not hand over our clients' pocketbooks to the contractors with the injunction 'take what you think is right, but please return us the cover.' Unless some restraint is exercised, with the amount of work there is to be done and with the universal feeling existing that 'my road must be built no matter what it costs,' prices will be driven up and up without regard to proper cost, values or profits."

With 100,000 miles of highway to be built costing $3,000,000,000 in the next five years (these are the figures Mr. Hirst gave in his address) there ought to be room for the world and his wife in the road construction business. The contractor who has made good in other lines has the fundamental training necessary for road work. He knows how to handle men, how to get materials and the general principles of construction work.

There is $3,000,000,000 to be spent. Who is going to get it?

Happy New Year

EVEN if there is so much work ahead that if we are to get it done we ought to jump into it instanter, there always is time enough for the season's greetings. So to each of its 75,000 readers, SUCCESSFUL METHODS wishes a happy and prosperous New Year.

Where Road and River Meet—A Connecticut Highway

From Overseas

A "machinery show" in Germany where industry is trying to get on its feet again after the war.

An American street sprinkler on an American built road in the West Indies.

An example of good streets in India. This picture was taken in Karachi.

The highway building fever has spread to Mexico. This photograph shows Governor Canut of Southern California celebrating the opening of part of a new million-dollar Mexican National Highway.

There's Work to Be Done

1—A Wyoming Road Made of Native Material. This State Will Build 1,000 Miles of Such Roads in 1920.

2—Heavy Rock Foundation in Rhode Island.

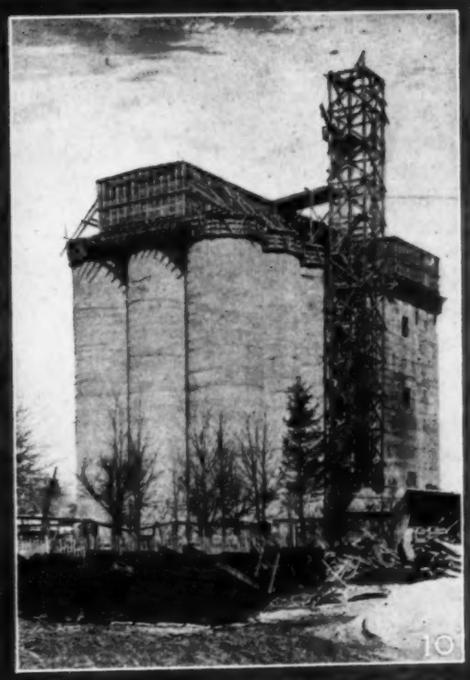
3—Brick Pavement with Concrete Gutters in Ohio.

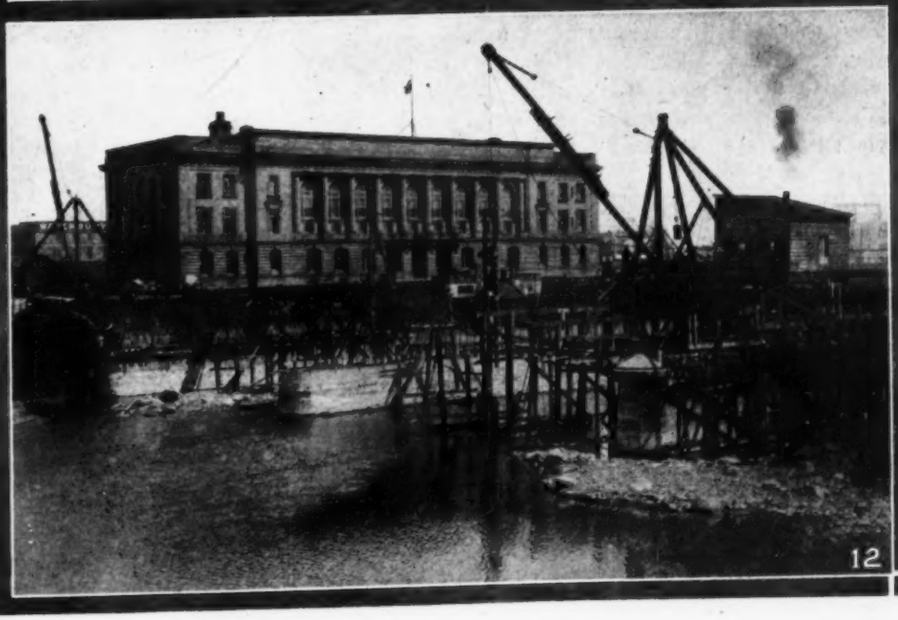
4—One of Florida's Lime Rock Roads, the Delight of Automobilists.

5—A New Hard Surface Road in Illinois Where $35,000,000 Will Be Spent for Improved Highways in 1920.

6—Eliminating a Grade Crossing on One of Pennsylvania's Picturesque Highways.

Throughout the Country





7—Shovelers at Work in the Excavation for the Cunard Building on Lower Broadway, New York City.

8—Acetylene Flare Light Permits Night Work on New Michigan Ave. Bridge, Chicago.

9—Digging a Sewer Trench in an Iowa Town.

10—Putting Up a Gigantic Concrete Grain Elevator in Michigan.

11—A Bucket Loader Piling Salt in Utah.

12—Constructing a Concrete Bridge in the Middle West.

EARLY MOVEMENT OF ROAD MATERIAL VITAL TO BIG BUILDING PROGRAM

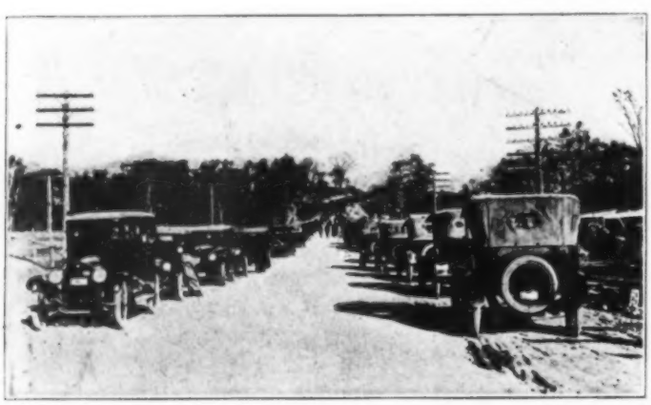
By J. L. Goldberg

Chief, Editorial Division, Bureau of Public Roads

A BRICK ROAD IN DELAWARE

WHEN seeds of information sown in a campaign of education fall upon the minds so fertile and receptive as those of the people of our nation, the result is astounding. The hearty, liberal, country-wide response to the call for money to construct a network of highways adequate to meet the demands and requirements of the marvelous growth of traffic has been more than astounding. Inspired by the passage of the first Federal Aid Road Act by which the Government appropriated $75,000,000 to enter into co-partnership with the state and stimulated by the further appropriation of two hundred millions of dollars, the states, one after the other, and the counties of the states have provided for vast sums to further the doctrine of good roads until now there is $633,000,000 immediately available for construction in 1920.

And in contemplating these figures it must be remembered that in no year in the history of road building has as much as one-fourth of this sum been expended upon new highways. But that the states will go far toward exceeding the expenditures of any previous year and constructing a greater mileage than ever before is forecast by the fact that several have already laid out programs that call for the building of more than a thousand miles within their respective boundaries. The people ask for these roads and are willing to pay for them. Illinois, with a population of approximately six million, has authorized a bond issue of sixty million dollars—about $10 per capita—and a little county in Arkansas—Phillips—with a population of less than 50,000, has pledged itself for $3,734,000 for good roads. That is about $75 per head, and with the money they propose to put 117 miles of road in places where there were hardly any before.



OHIO FEDERAL AID PROJECT NO. 1—BRICK SURFACE

It is estimated that last year $138,000,000 was expended in new construction. To put into construction the great sum available presents a tremendous task to the highway builders of the country. One factor will determine the degree of success with which this task may be accomplished. That is the movement of material. Without material there can be no roads. Without open top cars there can be no material. There must be a complete utilization of the open top cars for the movement of material at the time and all the time that such cars are available. Reports of the Railroad Administration show that in the earlier months of the year there are many thousands of open top cars standing idle. But in 1919, when the road building season was well advanced there was general complaint that no cars were available for the movement of material. The supply, always inadequate, was being used for the transportation of other products.

Recently Thomas H. MacDonald, the chief of the Bureau of Public Roads, in a letter to the State Highway

MACADAM WITH SHELL BINDER IN TEXAS

Departments, in which he points out that the only possible relief is to use the present transportation and materials production agencies in the most efficient manner possible, said:

"Everything possible must be done to facilitate transportation of road materials. Railroad transportation has become too important a factor in the amount of work that can be accomplished to allow it longer to be regarded as incidental. It has become the biggest item in road production. Contracts should be awarded as early as possible that the contractors may know the amount of materials they will require at different points and they should be encouraged to place their orders for the materials requiring rail transportation as long in advance of the time they will actually be required as possible. The placing of materials in storage piles involves some expense, but this expense is small in comparison to the loss occasioned by lack of materials when the contractor's organization is waiting.

"From the experience this year and in view of the greatly increased program for next year, it seems apparent that contracts which are not awarded during the winter months will have little opportunity of being supplied with materials which require rail hauling. Again, contracts should be awarded early and contractors should be encouraged to place their orders so that the material producers will operate their plants during all seasonable weather. In the past, too, many contracts have been held

until later in the year and material supplies have not been started moving during the period when the car supply is at its maximum. Also, contract prices have usually been lower for work awarded early in the season and the State Department and the Federal Bureau must recognize and respond to the public confidence which has been shown by the appropriations of large sums for highway improvement, by adopting every method that will help to secure the lowest prices and the most efficient expenditure of these funds.

"In view of the greatly enlarged program of road construction and the large amount of unfinished contracts which will have to go over because of lack of road materials, it would seem unnecessary to further accent the need for taking advantage of the supply of open top car equipment in February, March and April.

"It is apparent that many contractors who have not before been so engaged are looking to the highway field, and that the contractors' organizations will be expanded. The

MICHIGAN MACADAM—FEDERAL AID PROJECT NO. 25

labor shortage may in part be met by improved machinery and equipment, but the transportation and the supply of materials cannot be so readily or quickly expanded to take care of the greatly increased needs. Unless a forward looking policy recognizing these conditions is adopted at once, it is not apparent that a greatly increased production of roads will be possible next year over the miles constructed this year, yet the public is demanding of road building organizations a greatly increased production."

The highway department of the State of Illinois has devised a plan which it hopes will result in the shipment and storage in the early part of the season of a large portion of the material the state will require in the construction of the 1,000 miles of highway called for by the 1920

A VIRGINIA GRAVEL ROAD—FEDERAL AID PROJECT

plans. To supply the necessary material for this program will mean a severe tax upon the material producers unless the construction season be extended. In order to bring this about and thus assist in relieving the open top car situation as well as a possible shortage of materials, the state has decided to pay for such materials as sand, gravel and stone as delivered, without waiting for the same to be incorporated into the work. Vouchers will be issued direct to the railroad company for the freight and to the sand, gravel and stone producers for these materials. The same will be charged against the contractor and the amount thus paid will go to reduce estimates due the contractor as such materials are used.

This arrangement will apply not only to contracts now uncompleted, but also to the contracts to be awarded in 1920. In order to make this effective on existing contracts, a supplemental agreement will be made with the contractor and the surety company. This supplemental agreement will be forwarded to the contractor for his signature with the request that he procure the signature of the surety company at an early date.

Only the hearty co-operation of all the forces engaged in the building of our roads and the utilization to the fullest extent of equipment and producing power will bring in 1920 a result in road building accomplishment such as the public has a right to expect.

THE SHORTEST ROUTE IS BEST

IT has been the custom when building roads to stick too closely to the old established lines. The costs of buying new land for right of ways, of building new cuts and fills, bridges, etc., have been considered too great to justify a selection of new and shorter routes.

The present tendency, according to A. R. Hirst, State Highway Engineer of Wisconsin, is to select the shortest and best route and to make cost of construction a secondary feature.

"The new traffic conditions are so different and so intense that in considering the construction of a main trunk highway all of the old governing considerations no longer bind us to the old locations," said Mr. Hirst. "We must connect centers of population because they are the points from which things and persons come and to which they wish to go.

"Cost of construction has become secondary. If the very conservative sum of ten cents per mile is allowed for each mile of travel saved, the saving of a mile in distance on highways carrying the following average number of vehicles per day will save the traveling public the given amount per year, which is the interest at 5 per cent on the amount given in the third column.

VALUE OF A MILE IN HIGHWAY DISTANCE SAVED

Average Number of Vehicles per day	Saving to Owners Per Year	Saving Capitalized at 5% Equals
100	$ 3,650	$ 73,000
250	9,125	182,500
500	18,250	365,000
750	27,375	547,500
1,000	36,500	730,000
2,000	73,000	1,460,000
5,000	182,500	3,650,000
10,000	365,000	7,300,000

"I believe that these figures are unassailable," concluded Mr. Hirst, "and that they demonstrate that when building our main highways, saving in distance in the layouts is the supreme consideration."

MILLIONS FOR ROADS

States Are Ready for Highway Building Drive

NORTH ATLANTIC

New York

NEW YORK never stops building roads and expects to spend about $23,000,000 in 1920 for construction and repair of state and county highways. About 725 miles of new highways will be built, distributed among 56 counties, most of them above the Harlem River. A complete list of the projects which probably will be built was published in November last, the State Highway Commission thus giving contractors an opportunity to look over the road, locate sources of local material, investigate terminal facilities, etc., before the roads are covered with snow. Some of the contracts have been awarded and the others will be advertised and awarded in January, February, March and April so that construction work may be begun early in May and finished this year.

Frederick Stuart Greene is Commissioner of Highways with an office at Albany.

Pennsylvania

PENNSYLVANIA leads the entire list in the amount of money which it has ready to spend for highways during 1920. When last year began it had available $72,373,683.79 and as its expenditures in 1919 were under $20,000,000 there remains more than $52,000,000 to be spent this year. It is estimated that approximately 1,300 miles of roadway will be under construction by August, 1920. A total of 700 miles is now under construction. Before May 1 the State Highway Department hopes to award contracts for the construction of approximately 600 miles of new roads. The various counties intend to build about 120 miles of road.

W. D. Uhler is Chief Highway Engineer with his office at Harrisburg.

Massachusetts

MASSACHUSETTS is a state that will not know until its legislature meets just what it will do in the road building line during 1920. Luckily, however, it is one of the old states which has had an excellent highway system for many years and it is rather a case of reconstruction of old roads or maintenance of roads already built than the building of new ones that engrosses the attention of the Division of Highways of the Department of Public Works. It is probable that that the 1920 program will include the construction of about 30 miles of concrete road, 60 miles of bituminous macadam road and 40 miles of other types to be built in conjunction with the towns of the state. These figures include reconstruction of old highway as well as the construction of new ones.

Arthur W. Dean is Chief Engineer with an office at Room 212, State House, Boston.

New Jersey

THE State Highway Department of New Jersey expects to construct in 1920 between 50 and 75 miles of the State Highway System, including work in all sections of the state.

This, with the work under way and that part of the 1919 program to be completed early in the spring, will make upward of 200 miles to be completed by the fall of 1920 and will place about 325 miles of state highway permanently under state control for maintenance and future improvement.

The counties of the state probably will spend during 1920 $4,000,000 or $5,000,000 for new construction in addition to the amount spent for current maintenance. The state will expend on state highway work between $4,000,000 and $5,000,000 for new construction and through the State Aid funds to counties, including amounts to be spent by the counties themselves, there will be expended for new construction and maintenance between $8,000,000 and $9,000,000.

The types of pavement will be asphaltic concrete on macadam base, asphaltic concrete on concrete base and concrete pavements.

W. G. Thompson is State Highway Engineer with his office in the Broad Street Bank Building, at Trenton.

Connecticut

CONNECTICUT is a small state and its roads have been good for many years, but nevertheless it is keeping right up to date in the country-wide road building movement. It has $6,000,000 available for the construction of new roads during 1920 and in addition the sum of about $1,000,000 per year, the receipts from automobile license fees, which will be used for reconstruction and maintenance work on the highways already existing.

Charles J. Bennett is State Highway Commissioner with his office at Hartford.

Maine

MAINE is one of the leaders in maintenance work and during 1920 expects to spend $900,000 on continuous patrol maintenance of its 4,500 miles of road. Also about 150 miles of state highways will be built at a cost of about $4,000,000. About 125 miles of State Aid roads will be constructed costing $1,250,000. For bridges the state will spend $1,000,000.

The mileage of road to be constructed will be divided among the following types: Portland cement concrete, bituminous macadam and gravel. The exact mileage of each has not yet been determined. It is expected that half the $4,000,000 expenditure for state highways will be money received from the Federal Government as Federal Aid, and of the state fund about $600,000 will be contributed by the cities and towns. Substantially one-half of the money for bridges will be furnished by towns and counties and of the maintenance expenditure about $200,000 will be furnished by cities and towns. The rest of all of these funds will be furnished by the state and all of this work will be under the direct supervision of the State Highway Commission.

Paul D. Sargent is Chief Engineer with his office at Augusta.

Rhode Island

THE smallest state in the Union and also one of the original thirteen, Rhode Island has a pretty well established system of highways and it doesn't need to spend the vast amounts that some of the newer states further west are putting into road construction. During 1920 between 35 and 40 miles of concrete, bituminous concrete and bituminous macadam will be built at a cost of approximately $1,100,000.

Irving W. Patterson is Chief Engineer with an office in Room 12 State House, Providence, R. I.

New Hampshire

THE Granite State has $5,000,000 left over from 1919 with which to begin its 1920 program of road building. It is not going to be contented with the left-overs, however, and is planning to spend about $2,250,000 more. About 65 per cent of the road building in New Hampshire this year will be of gravel.

Frederic E. Everett is the State Highway Commissioner with his office in the State House, Concord.

Vermont

FEDERAL Aid projects covering approximately 58 miles of road will be built in Vermont during 1920, although the list has not yet been published. There is an unexpended balance of Federal Aid money amounting to $610,000 which the state will match.

The amount of State Aid work will not be determined until after the town meetings in March, although the total usually appropriated for highway, bridge and maintenance work is approximately $950,000. In order to take advantage of this money the towns add about $400,000 and in addition to this there will be several state appropriations for highway work amounting to about $50,000, making a total of approximately $1,400,000 in addition to the Federal Aid funds. All of this will be expended under the supervision of the state. The towns also have special highway funds that are used locally.

Stoddard B. Bates is the State Highway Commissioner with his office at Montpelier.

SOUTH ATLANTIC

Georgia

THE biggest of the southern states has about $6,000,000 ready to spend for road building during 1920. Most of it will be used for the construction of permanent bridges and paved roads. The counties of the state will furnish about $2,000,000, the Federal Government $2,000,000 more and the third $2,000,000 will come from the automobile license fees.

In addition to the $6,000,000 worth of new work, 50 projects of a value of about $4,230,000 are under construction and probably will be completed during the year. Of a total mileage of 759.87 miles under construction and planned, 174.92 miles will be paved road, 556.45 miles will be of sand-clay and 28.50 miles will be graded road.

W. R. Neel is the State Highway Engineer with his office at Atlanta.

North Carolina

NORTH CAROLINA'S road building program includes 108 projects which will cost $10,000,000, of which $4,000,000 will be Federal Aid money. Of these projects, 35 are now under construction, 8 have been advertised, 63 are under survey and 2 have been completed.

W. S. Fallis is State Highway Engineer with his office at Raleigh.

Virginia

THE Old Dominion has joined in the road building movement with enthusiasm and during 1920 will spend about $5,000,000 for the construction of new roads. About 225 miles will be built and the work will be about equally divided between penetration, open mix and concrete. Many of the gaps that now exist in the state highway system, which includes about 1,500 miles of road, will be filled this year, giving the state an improved and connected system.

G. P. Coleman is the State Highway Commissioner with his office at Richmond.

South Carolina

SOUTH CAROLINA built about 180 miles of road last year at a cost of $2,000,000 and is planning to more than double that program this year. The 1920 plans provide for the construction of 400 miles of road at a cost of $5,000,000.

F. H. Murray is Acting State Highway Engineer with his office in the Commercial Bank Building, Columbia.

Maryland

MARYLAND is awaiting the action of its legislature, which convenes this month, to decide its road building program for 1920. During the year just closed it built about 100 miles of concrete roads, costing about $3,000,000, and maintained about 1,600 miles of road with the receipts from motor vehicle license fees, amounting to $1,400,000. The State Road Commission expects to receive $1,750,000 this year from the motor vehicle license fees and it seems probable that the legislature will appropriate at least as much as was spent the last year.

John N. Mackall is the Chief Engineer with his office in the Garrett Building, Baltimore.

IN THE WEST VIRGINIA MOUNTAINS

West Virginia

ROAD building in the mountains of West Virginia is by no means an easy task, but the State Road Commission has tackled the proposition with enthusiasm and is doing some splendid work in many of the more mountainous sections. During 1920 the state will spend about $5,000,000 raised by direct road levies, county bond issues, state and Federal Aid. About 200 miles of hard surfaced roads will be built and 150 miles of grading done.

A constitutional amendment will be voted upon in November, 1920, by the people which, if passed, will allow the state to build main highways. The progress of road building in West Virginia depends a great deal upon whether or not this amendment is passed. Under the county system it will be a good many years before any connected improvement will be possible.

C. P. Fortney is Chairman of the State Road Commission with an office at Charleston.

Florida

IT is no easy job to build roads, especially hard surface roads in the sandy soil of Florida. The State Road Department is planning to construct this year 200 miles of state roads, two-thirds of which will be of brick and concrete and the remainder of shell and sand clay. There will be available approximately $3,500,000 derived from Federal, state and county sources. The contracts for most of the permanent paving will be awarded early in January. In addition to the state's program the various counties will carry out their local road construction plans in which they will spend approximately $4,000,000 derived from county bond issues and direct taxation.

District of Columbia

THE little District of Columbia, child of all the states, must not be forgotten in any list of road building plans, even though the $500,000 which it intends to spend during 1920 looks rather small when compared to the millions mentioned in the preceding pages. Much of the construction in the District of Columbia will be street work. Sheet asphalt will be used on the more heavily traveled thoroughfares, and concrete and macadam on the others.

Lieut. Col. F. S. Besson, Corps of Engineers, U. S. A., is the Engineer Commissioner of the District of Columbia with his office at Washington.

Delaware

ANY automobilists who remember with vexation the delays in passing through the traffic of towns will find comfort in Deleware, where the State Highway Department is planning its new roads so that they pass close by instead of through the towns along the route. If a man wishes to visit any particular town he may do so, but if not he will not be compelled to pass through the dense traffic.

Deleware's highway system has various other features of which it is justly proud. Long tangents, flat curves and easy grades are typical. As outlined at the present time, the state highway system has no curves of less than 1,910 ft. radius and few grades exceeding 1 per cent. About $2,500,000 will be spent in Deleware this year and about 80 miles of Federal and State Aid highway will be built of cement concrete.

Charles M. Upham is State Highway Engineer, with his office in Dover.

SOUTH CENTRAL

Texas

THE road building plans of Texas are as ambitious as the state is large. The first thing on the schedule for 1920 is the completion of 200 Federal Aid projects in 95 counties. These projects now are in course of construction or preparation. This means the building of about 2,144

ASPHALTIC CONCRETE IN ARKANSAS

miles of road at a cost of $21,600,000. Concrete will be used on 87 miles, bitumens on 262 miles and gravel or macadam on 1,795 miles. These figures include only the work upon designated state highways.

During 1919 about $80,000,000 worth of county road bonds were voted and $33,000,000 has been appropriated, which will mean an increase of about 20 per cent in county road building during 1920.

Rollin J. Windrow is the State Highway Engineer with his office at Austin.

Kentucky

DOWN in Kentucky the legislature, which is about to meet, is going to have a chance to change the laws of the state in such a way that about 250 miles of modern roads may be built at a cost of about $7,000,000. Most of it will be of concrete, brick and bituminous concrete. At present the Blue Grass State is handicapped by lack of adequate highway legislation.

William N. Bosler is the State Highway Engineer with his office at Frankfort.

Tennessee

IF the labor and materials can be obtained Tennessee will build about 625 miles of roads during 1920. Of these, about 200 miles, distributed through seven counties, will be of bituminous or concrete construction, and the remaining 425 miles in about 15 counties will be of gravel and macadam. About $12,000,000 is available for road construction this year.

A. M. Nelson is State Highway Engineer with his office at Nashville.

Alabama

IT is up to the people of Alabama to decide whether or not their state shall keep pace with her sister states in road building. They will have their chance on Feb. 16, when a special election will be held to decide whether or not to issue $25,000,000 worth of road bonds.

If the bond issue goes through, Alabama will spend not less than $4,000,000 for roads in 1920, about half of which will be Federal Aid money. The various county seats have been selected as the points to be considered in the Alabama road system and roads will be constructed to connect them. Traffic conditions will determine the type of road to be built in each case.

W. S. Keller is the State Highway Engineer with his office at Montgomery.

Mississippi

MISSISSIPPI is planning a state-wide system of improved highways on which to move the cotton crop in 1920. Approximately $15,000,000 in cash is already available and Federal Aid will amount to $5,000,000. In addition to this money, the legislature will be asked to issue state bonds for $25,000,000, all of which will be used to carry out the enormous maintenance and construction program outlined by the State Highway Department.

Xavier A. Kramer is State Highway Engineer with his office at Jackson.

Oklahoma

ONLY a shortage of cars and lack of material will keep Oklahoma from spending from $5,000,000 to $8,000,000 on its highways this year. The plans of the Department of Highways include the building of about 200 miles of road, half of which will be surfaced with local gravel and the rest with concrete, asphaltic concrete, vitrified brick and macadam. A number of bridges will be built across large overflow streams.

Max L. Cunningham is State Highway Engineer with his office in the Capitol Building at Oklahoma City.

Arkansas

THOSE who have been accustomed to think of Arkansas chiefly as the home of the "hill-billies" may be surprised to learn that the state is one of the real leaders in the road-building movement. In 1919 the legislature authorized bond issues of $100,000,000 for the construction of 8,500 miles of highway, the work to last over a period of five years. Contracts already have been let for 2,600 miles at a cost of $40,000,000 and it is hoped that about 750 miles of this work will be completed in 1920.

Of the total mileage more than 500 miles will be of high type construction. One county has voted $4,500,000 of road bonds and another $2,750,000, while the largest single Federal Aid project in the United States is being built in Arkansas at a cost of $3,500,000. This road will have asphaltic concrete surface on a concrete base, is 152 miles long and traverses five counties in southeastern Arkansas.

V. P. Knott is State Highway Engineer with his office in Little Rock.

AN ILLINOIS MATERIAL YARD

NORTH CENTRAL

Illinois

ILLINOIS, which always has been among the leaders in the campaign for better roads, hopes to build about 1,000 miles of roads during 1920 at a cost of approximately $35,000,000. About 125 miles will be Federal Aid work and the rest will be with the proceeds of the $60,000,000 bond issue. A thorough distribution of construction work throughout the state is the plan of the Division of Highways and at present the types of road to be built still are undetermined because alternate bids are asked for on cement concrete, bituminous concrete and brick roads. The awards of contracts will be made as soon as possible so that the successful contractors may circumvent the threatened shortage of materials and railroad equipment by getting their material delivered early.

Clifford Older is Chief Highway Engineer with his office at Springfield.

Ohio

OHIO, which for years was famed for its pike roads, is keeping at the head of the procession, now that modern traffic conditions have rendered the old roads obsolete. At the present time surveys and plans are in process of completion for approximately 1,000 miles of road. With the sum of about $25,000,000 available for the improvement of roads during 1920, the Highway Department intends to award contracts during the season for the improvement of 700 miles. The various types of road surfacing that have predominated during the last year, namely

brick, concrete, asphaltic concrete, bituminous macadam and waterbound macadam, will be favored. Improvements will include the construction of bridges and culverts, grading and pavement, but in a few instances it will be found advisable to contract only for bridges and culverts and grading where heavy fills are required to bring the present road surface to proper grades and alignment.

H. D. Bruning is Chief Highway Engineer with his office at Columbus.

Missouri

MISSOURI is making certain that no one part of the state will be discriminated, either for or against, in its road building program. Under the Hawes Road Law with the McCollough-Morgan amendments, not less than 50 miles of road will be built in each county. The first $1,200 per mile of cost will be given free from State and Federal Aid provided the county pays for the surveying. One-half the cost above $1,200 per mile is borne by the Government and the other half by the county. In case a county refuses to furnish the money to build sufficient road the State Highway Department is authorized to spend at least $60,000 in such county and build as many miles as that sum will pay for.

The state road building program is a big one and provides for the construction of 6,000 miles of road within the next three years. The legislature has appropriated $3,200,000 to be spent during 1920. Counties and districts have voted $16,814,000 in road bonds and within the next few months counties probably will vote an additional total of about $22,000,000. The roads built will be concrete, gravel, bituminous macadam, brick, macadam and graded earth.

The Chief Engineer of the State Highway Department is Alexander W. Graham, who has his office at Jefferson City.

Michigan

THE State Highway Department of Michigan has available for expenditure during the 1920 road building season $5,000,000 from a bond issue, approximately $1,250,000 in Federal Aid and a budget appropriation of $2,500,000. The funds available from the bond issue and Federal Aid will be spent almost entirely in the construction of portions of the state trunk line system, while the maintenance of this system and the State Aid given to townships and counties will come from the budget appropriation. The

ASPHALTIC CONCRETE ROAD IN MICHIGAN

budget appropriation is made up of a direct tax levy of about $1,125,000 plus the receipts from the registration of motor vehicles. State Aid is paid on non-trunk line highways comprising the county system and roads improved by townships under state specifications in the amount of 25 per cent of the cost of these roads, so that a report of expenditures for the payment of State Aid will necessitate the appropriation of three times that amount from county or township funds.

It is probable that about 950 miles of State Aid roads will be built and a considerable additional mileage constructed under state supervision. At present there are 516 miles under construction, most of which will be completed during 1920. Michigan's policy is to let the amount of traffic and character of the road govern the width and type of highway to be built. In some cases sections are being paved with concrete, asphaltic surface or other pavement to a width as great as 24 ft. In many other cases temporary earth roads are being built and maintained until such times as the traffic demands a more durable surface.

William W. Cox is Chief Engineer with his office at Lansing.

Indiana

A RESUME of Indiana's road building plans would never lead one to believe that the present State Highway Commission was organized in May, 1919, but that is a fact. One feature of the Commission's work is its division into construction and maintenance departments with a chief engineer in charge of each. The maintenance department will undertake the care of the 3,200 miles now in the state highway system and will be in charge of A. H. Hinkle, who did similar work in Ohio.

The construction work will include approximately 135 miles of state highway and will cost about $5,000,000. Most of it will consist of cement concrete, although in a number of cases bituminous concrete will be used. Plans for 300 miles of additional work have been prepared and a number of bridge structures also will be put up. Indiana derives its road funds from the automobile license fees, the inheritance tax, a direct levy and Federal Aid.

H. K. Bishop is Chief Engineer of Construction with his office in the Capitol Building at Indianapolis.

Wisconsin

AS usual Wisconsin is planning to spend plenty of money on roads during 1920. The State Highway Engineer's statement of his plans follows:

"The amount of highway construction to be done in Wisconsin in 1920 depends not upon the amount of money which may be available, but upon the supply of labor and materials. For State Aid, for Federal Aid and for construction on bond issues, there will be available approximately $18,000,000. There will be available $2,000,000 for state trunk highway maintenance, and in addition, not included in the foregoing, several millions of dollars for construction controlled by the counties and towns.

"If we can spend the $18,000,000, we would expect to build about 400 miles of cement concrete road, about 300 miles of crushed gravel road, about 100 miles of stone macadam roads of various types, and probably 200 miles of grading without surfacing."

A. R. Hirst is State Highway Engineer with an office at Madison.

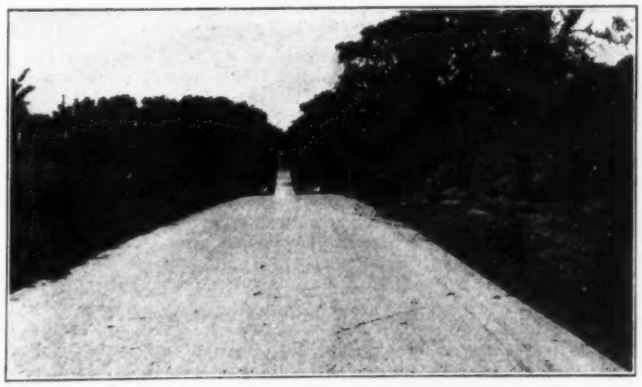
Iowa

MORE money on hand than it probably will be able to spend is Iowa's lot just now. Bond issues, regular tax levies, special assessments, Federal Aid allotments and automobile license fees will give the state more than $30,000,000 to spend for road and bridge work if it can find the necessary labor, contractors and materials. The estimated amount of road construction for 1920 is as follows: Paving, 355.85 miles; gravel surfacing, 231 miles; earth road construction, including grading and draining, 1,334 miles; making a total of approximately 2,000 miles of construction on primary or main road systems with the help of Federal Aid money. Some 1,000 miles of graveling probably will be done on the county road system with strictly county funds. There will be a great deal of earth road construction on the county system and a limited mileage on the township road system. The paving will be of concrete and brick almost exclusively.

Fred R. White is the Chief Engineer with his office at Ames.

Minnesota

MORE than twice as many miles of hard surface roads will be built in Minnesota this year than last. During 1919 about 90 miles of concrete roads were constructed and if the materials, tractors and men can be



A STRETCH OF IOWA'S NEW ROADS

found, about 200 miles will be built this year. In addition to this approximately 1,500 miles of grading and gravel roads have been planned. The state has ready for highway work about $18,000,000. An attempt is being made in Minnesota to obtain new legislation which will permit the building of trunk lines and add greatly to the usefulness of the state's highway system.

C. M. Babcock is State Highway Commissioner with his office in St. Paul.

Kansas

THE State of Kansas to date has financed 1,344 miles of improved highways, the estimated cost of which amounts to $48,859,395. This bears out the tales of the wealth of the Kansas farmers. The State Highway Commission has granted to the counties Federal Aid on 468 miles of road at an estimated cost of $24,005,104. Federal Aid contracts have been awarded to December 1 for 143 miles of hard surfaced roads at a cost of $4,196,900.

Kansas has completed during the 1919 season 20 miles of this amount, leaving 123 miles of highway which must be finished during the 1920 season. Of the roads which have been awarded to date, 64 miles are of concrete, 55 miles of brick, 19 miles of gravel and 5 miles of macadam.

It is the intention of the State Highway Commission to continue the receipt of bids through the winter and to attempt to have under contract road work amounting approximately to $30,000,000 before the first of July. Inasmuch as the state has no funds for the construction of highways, all contracts are let by the counties at the county seats, but under the supervision of state. The State Highway Commission is urging that the contractors procure as much material as possible during the winter and spring months so as to avoid difficulty in procuring the material in the rush season of the summer and fall.

MONOLITHIC BRICK—KANSAS

M. W. Watson is the State Highway Engineer with his office at Topeka.

Nebraska

NEBRASKA is planning to improve 2,905 miles of road during 1920 at an estimated cost of $3,800,000. The Nebraska highway system has approximately 4,500 miles of road so located that all important towns and county seats are connected. The state highway system will be marked, the number of the road being given at each mile post and a patrol system will begin this year. The marker will carry the name of the patrolman so that the public will know who is responsible for the maintenance of each section of the road. Direction and danger signs also will be set up at the proper points.

In its road building work Nebraska is using considerable surplus army equipment received from the government, including 147 trucks and 50 caterpillar tractors. This equipment is being used wherever Federal money is being spent for construction or maintenance. When used by counties or contractors a per diem charge is made to provide a sinking fund so that when the equipment is worn out it may be replaced. The automobile tax has been increased to 50 cents per hundred pounds, with a minimum of $10, one-fourth of the money to be spent on county roads and three-fourths for the maintenance of the state highway systems in the counties where the taxes are collected.

George E. Johnson is Chief Engineer with his office at Lincoln.

South Dakota

SOUTH DAKOTA has 60 counties and in nearly every one of them road construction will be carried on by the State Highway Commission during 1920. Most of the new roads will be Federal Aid projects which will have a width of 24 ft. and gravel surface to a depth of 6 in. The amount to be spent will be about $5,000,000. The individual counties will spend about $3,000,000 for county roads and about $2,000,000 for bridge construction. Bids for about $1,000,000 worth of work will be advertised in ten counties about the middle of February. Although automobile license fees are used for maintenance, elections will be held before spring in several counties at which bond issues for the construction of hard surfaced roads will be voted.

Frank S. Peck is the State Highway Engineer with his office at Pierre.

North Dakota

THE State Highway Commission of North Dakota is only two years old, but already has done considerable work. Since its organization in March, 1917, about 400 miles of earth and gravel roads have been constructed, and by taking advantage of Federal Aid in the next three years the commission expects to do about $2,500,000 worth of work each year. One of the biggest projects under way is the construction of the first highway bridge across the Missouri River in North Dakota. It will be between Bismarck and Mandan and cost $1,000,000.

There are about 70,000 miles of public highways in the state, of which 5,000 miles are included in the state highway system. Thus far concrete roads have not been constructed, but it is probable that about 2 miles of concrete road will be built in Grand Forks this year. An attempt is now being made to place before the people of the state at the general election next fall an amendment to the constitution which will permit the issuance of $50,000,000 in highway bonds.

W. H. Robinson is Chief Engineer with his office at Bismarck.

WESTERN

California

CALIFORNIA'S report on its road building plans for 1920 is full of "ifs." True to its reputation, the Golden State has the money and the plans for a big program of road construction, but the State Highway Engineer must have been in a pessimistic mood when he wrote to Successful Methods. Pessimism isn't always a bad thing, however, especially when it points out some dangers that the optimist is prone to overlook. The statement follows:

"The California Highway Commission is making plans to spend in good roads development in California a total of $10,000,000 in 1920 or about $800,000 per month; if the money markets are favorable for the sale of State Highway bonds; if the United States Railroad Administration will assign enough freight cars to supply the contracts with the necessary material; if the supply of labor does not run short and if the wage of labor becomes stabilized so that contractors may bid intelligently on the work. The earliest work contemplated will be the completion of the gaps in the trunk lines and the work on the county seat laterals."

A. B. Fletcher is State Highway Engineer with his office in Sacramento.

Washington

PLANS to have all of its contracts let by May indicate that the state of Washington will get most of its contemplated road work completed this year. About 60 miles of concrete, 18 and 20 ft. wide, will be built, and about

150 miles of grading and gravel surfacing will be done. Some $3,500,000 will be expended.

James Allen is State Highway Commissioner with his office at Olympia.

Colorado

COLORADO has not forgotten its scenery in preparing its road building plans for 1920. The first items on the docket are the completion of the Fall River road which connects Estes Park road on the eastern slope with the Grand Lake road on the Western slope, passing through the Rocky Mountain National Park. Work will be continued on the Independence Pass road, also a way of scenic splendor. In the Grand Canon above Glenwood Springs the road now under construction will be completed. These three jobs alone will cost about $155,000.

In addition to this work, the state has outlined a program of about 800 miles of road improvement for the year 1920. Of this some 50 miles will be hard surfaced pavement, the balance being graded, and surfaced with gravel or crushed stone. The total expenditure for this work will be about $4,500,000. A bond issue of $5,000,000 to aid the state in meeting the Federal Aid will come up and be voted on in November, 1920. The counties of the state will spend approximately $2,500,000 in the maintenance of their road system, but a portion of this undoubtedly will be used for new construction work. Any additional funds needed to meet the Federal Aid must come from the various counties by special appropriation.

J. E. Maloney is Chief Engineer, with his office in Denver.

Oregon

THERE will be expended upon state highways in Oregon during the 1920 season approximately $17,000,000, consisting of $11,000,000 of state funds, $4,000,000 of government funds and $2,000,000 of county funds. With this expenditure, approximately 300 miles of hard surface payment will be constructed, 200 miles of broken stone or gravel macadam surface and 300 miles of grading. The state highways are in general graded to a width of 24 ft., macadamized to a width of 16 ft., and paved to a width of 16 ft. with a 2-ft. shoulder on each side.

Bidding on paving work on state highways is left open to all types of pavements. On this basis there have developed three competitive types as follows: Portland cement concrete, asphaltic concrete or bitulithic on gravel bituminous base, and asphaltic concrete or bitulithic on broken stone macadam base. Which of these three types can be constructed most cheaply on any section of road depends of course upon local conditions, especially the availability of material. Of the work placed under contract during 1919, approximately 70 per cent was asphaltic concrete or bitulithic on macadam base, 20 per cent asphaltic concrete or bitulithic on gravel bituminous base and 10 per cent Portland cement concrete.

Herbert Nunn is Chief Engineer with his office at Salem.

Montana

THE 1920 highway construction program of Montana contemplates the expenditure of about $5,500,000 on main state highways and between $3,000,000 and $4,000,000 on county highways. Federal Aid funds are to be applied on approximately $500,000 worth of paving projects within incorporated cities or towns. The volume of work contemplated is approximately as follows: Modern paving on state highways, 50 miles; compacted gravel or macadam type surface, approximately 1,100 miles; natural surface, approximately 300 miles.

John N. Edy is Chief Engineer with his office at Helena.

Utah

UTAH, a state which at one time suffered from lack of suitable and adequate transportation facilities, has made wonderful progress in overcoming this condition and will spend $5,000,000 on its roads in 1920. This amount includes Federal Aid. The 1920 plans call for 92 miles of hard surface and 290 miles of graded earth roads. The beet sugar and the canning and preserving industries are expected to increase two-fold as a result of this improvement in transportation.

Ira R. Browning is Chief Highway Engineer with an office at Salt Lake City.

New Mexico

NEW MEXICO'S roads are open all the year round with the exception of a few passes high up in the mountains, but nevertheless the state has undertaken patrolling and maintenance work which will keep the patrol crews going twelve months in the year. That is a bigger job than confronts most of the states. The state expects to have about $4,000,000 available for construction work this year, and is planning to construct about 3,000 miles of road during a three-year period. The greater part of it, however, will be finished during 1920. Nine Federal Aid projects now are under construction and many more are ready to be let. The 1919 road census shows that there are about 43,000 miles of road in the state, of which about 7,100 miles have been designated as state roads. Approximately 3,000 miles of the 7,100 are known as Red Line roads and are being maintained or constructed by the State Highway Commission.

L. A. Gillette is the State Highway Engineer with his office at Santa Fe.

Idaho

ENTHUSIASM and progress are the order of the day in Idaho's road building. The amount of money available for use in 1920 under the terms of the Federal Aid Road Act is far short of the amount required to match the state, county and highway district funds. About $17,000,000 will be raised in the state for highway construction in 1919-1920. About $3,360,000 of this will be Federal Aid funds.

There is now under construction or to be constructed during 1920, 624.7 miles of state highway. Of this about 300 miles will be surfaced with gravel and crushed rock; about 200 miles with earth and crushed rock; about 60 miles with concrete and 40 miles with sand and clay. About 1,000 additional miles of state highway are surveyed at present and much of the work on it will be done during 1920. Five large bridges will be built this year at a cost of $500,000.

D. P. Olson is Director of the Bureau of Highways, with his office in the Capitol Building, Heyburn Park, Boise.

Arizona

ARIZONA'S main road system consists of two big east and west highways, one across the northern end of the state and the other across the southern end. The southern highway has two branches in the eastern half of the state, one by way of Phoenix, Tuscon, Tombstone, Bisbee and Douglas and the other by way of Phoenix, Superior, Miami, Globe, Safford, Clifton and Franklin. The western end of this highway is at Yuma, where it crosses the Colorado River and connects with a highway to the coast now under construction by California.

In addition to the two eastern and western highways there is a connecting highway running north from Phoenix to Williams through Prescott and Jerome. The Arizona highway system also will be connected with the Utah system by a bridge across the Colorado River in Mohave county.

About $4,000,000 will be spent during 1920 by Arizona, about half of which will be Federal Aid money.

Thomas Maddock is State Highway Engineer with his office at Phoenix.

Wyoming

WYOMING is going to depend largely upon its own resources for its new roads. It plans to spend about $3,000,000 and to build about 40 miles of hard surfaced and 1,000 miles of natural material roads. Wyoming's natural deposits will supply nearly all of the necessary surfacing materials and about all that will have to be brought in from outside will be the culvert pipe, reinforced steel and cement and a comparatively small amount of structural steel for bridges.

But it is another story when contractors and laborers are considered. Practically all of the local supply of labor will be engaged in maintenance work and the new construction will have to be done by contractors and laborers from outside.

D. S. McCalman is State Highway Superintendent with his office at Cheyenne.

Nevada

ALTHOUGH the smallest state in the Union in point of population, Nevada is keeping pace with the other states in its road building campaign. During 1920 it expects to spend about $2,000,000 for roads. The state will build about 30 miles of concrete paving and 300 miles of other types, chiefly gravel. Several reinforced concrete bridges also will be put up. The plans for the largest part of this program are now complete and advertisements for bids will be out on January 10.

C. C. Cottrell is the State Highway Engineer with his office at Carson City.

AMERICAN MACHINERY IN SPAIN

Mixer, Chuting Plant and Hoist All Made in United States Are Engaged in Work of Building New Docks at Seville

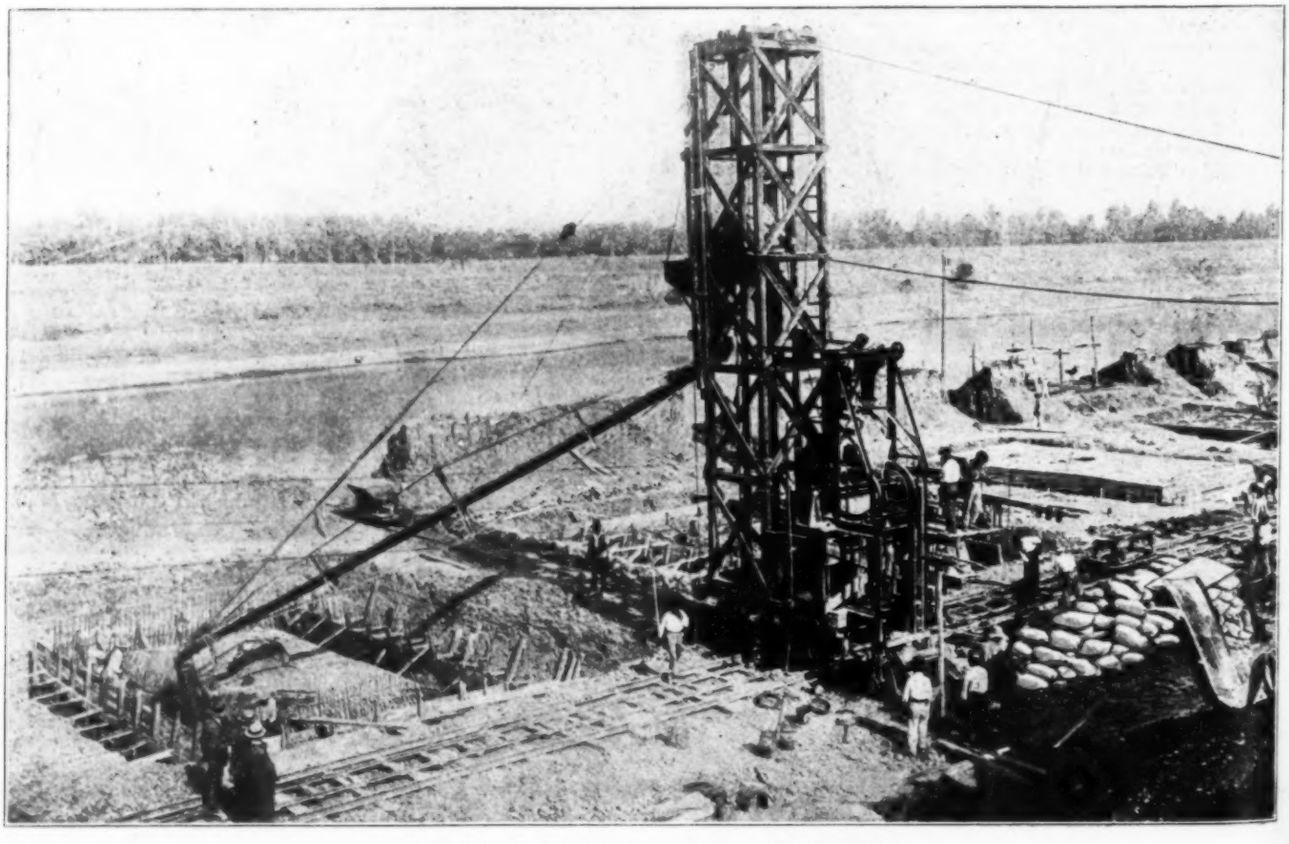
By R. C. Granados

SEVILLE is now a city of about 180,000 inhabitants and is rapidly developing into the industrial and commercial center of southern Spain. The need for a new modern harbor has long been felt and a comprehensive system of modern docks on the new canal was finally decided upon in August, 1916. The present docks are situated on the Guadalquivir River near the center of the city. Just below Seville the river makes many large bends which are being eliminated by several sections of canal. The last section connects with the river directly below the present harbor and it is here that the new docks will be located.

The work, which is now being executed, consists of widening the canal in front of the proposed docks up to a width of 125 meters which will permit the swinging of ships up to a length of 100 meters and even somewhat longer; construction on the left bank of the canal of 800 meters of dock for the handling of general merchandise, together with the necessary buildings and equipment within its zone; and construction on the right bank of the river of 300 meters of dock for the unloading of coal and for the loading of ore, together with the machinery necessary for this service. It has been estimated that the 800 meters of main dock will be able to take care of the increase in traffic for a period of 10 years.

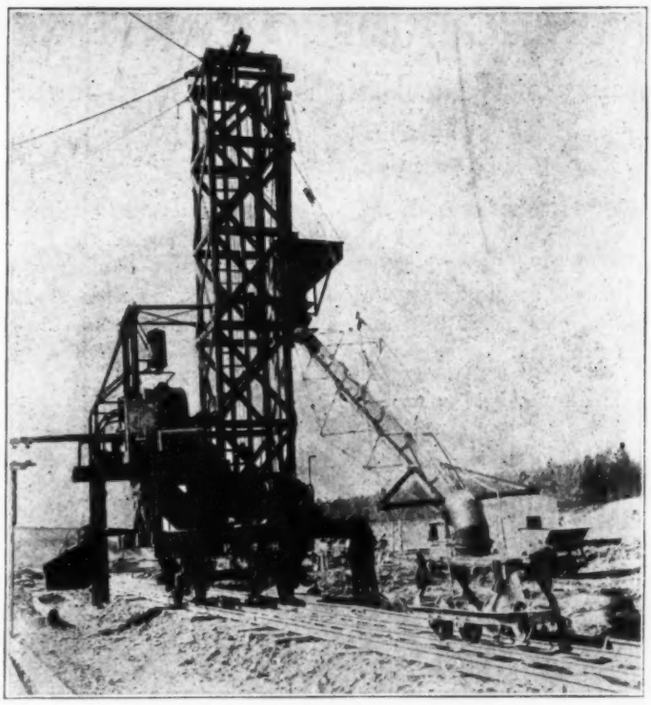
The original project for the building of the docks called for a reinforced concrete structure consisting of flat beam flooring resting on cylindrical piers of 2.50 meters diameter. This original scheme was abandoned due to the high price of steel in Spain during the war and finally it was decided to carry out the work in its present form, that is, with solid concrete arches resting on solid piers which will be carried down by caissons from 9 to 12 meters, to their final rest on a hard and compact clay. This method will result in considerable saving as practically no reinforcing will be required. Furthermore, the work can be carried out with ordinary labor instead of the skilled workmen necessary for the placing of reinforced concrete. The bank within the water will be protected with heavy stones and blocks. The end of the concrete arches will be closed with reinforced slabs resting on reinforced concrete piles. After finishing the concrete work an earth fill will be made bringing the level of the docks to 7.90 meters above low tide which is well above the usual annual flood level of the Guadalquivir River.

For placing the concrete it was decided to use a portable concrete mixing and distributing plant built on a standard railroad platform of the Spanish type. The maximum distance to be reached with the spouting is 22 meters. For this purpose it was decided to use an American chuting plant. The mixer is also American-made. The material is brought by train to the edge of the upper



MIXING AND CHUTING PLANT IN OPERATION.

level and dumped down the bank, being placed into the loader by hand. The hoist is an American electric single drum with 15 h. p. variable speed motor. The mixer is also electric-driven, using the 3-phase, 220-volt, 50-cycle current which is the most generally used in Spain. Power is taken off by means of a horizontal trolley which projects from the mixer platform. The specially designed tower was built in Seville of Spanish pine. It is now erected and is 12.75 meters high, but the height is to be slightly increased later in order to pour the arches of the dock. The platform on which the plant was erected is 2.20 meters wide and only 4.40 meters long, so that the base of tower and mixer platform project slightly, while the hoist had to be set directly against the tower.



SPOUT SUPPORTED BY SMALL CAR.

On account of the relatively high tower it was found that the weight of the 27 meter chute had a tendency to bend it when guys were removed for moving the platform forward. In order to obviate this it was decided to rest the end of the chute line on a small platform car running along an industrial track placed on the regular platform track. In this way the whole outfit is perfectly balanced and is easily moved along with guys altogether released. In its working position the tower is only guyed on the side opposite the chuting.

For the movement of the platform along the track the winch head on the hoist is being used. A manilla rope is fastened to the track passing on to a sheave placed on the bottom of the platform frame and from here on to the winch head. In this way the whole outfit is quickly moved in either direction.

The whole installation is being operated by Spanish laborers who were altogether unfamiliar with machinery of this kind. Nevertheless, on the second day of its operation these men were already obtaining as high as one batch every two minutes. The plant was put in operation on August 15 and after two months' work the superintendent of the job reports as follows:

"The mixer, hoist and chuting equipment have been working perfectly and without a single day's interruption. We are now working intermittently placing concrete along the whole line for the various caissons. We are pouring from 100 to 150 cubic meters per day. The operation of the side loader has been made much more efficient. The 20 men who were loading with baskets have been reduced to 5 who shovel the sand and gravel directly into the side loader. The total number of men now being used for the operation of the plant is as follows: Three on mixer and hoist, 5 loading gravel and sand, 1 loading cement and 2 for the handling of the chute, that is a total of 11 men."

The project, as well as the erection of the docks, is being carried out directly by the "Obras de la Ria del Guadalquivir y Puerto de Sevilla," the Government Port Works Commission, under the direction of Jose Delgado Brackenbury, chief engineer. It is estimated that the whole project will be finished in about two years.

HOW TO KEEP CEMENT SACKS

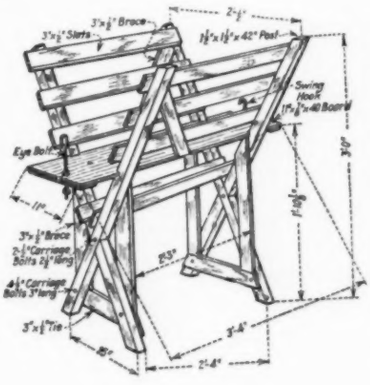
Use a Holder or Box—Make Bundles of 50 Sacks

ALTHOUGH cement sacks make convenient tool bags, aprons, knee-pads, etc., their use for such purposes costs the contractor 25 ct. for each sack. Various methods have been devised for caring for these containers, but the principal point to observe is that of always following the method.

One method used is to have alongside the mixer a tight box with a locked lid, in which is a slit, through which the sacks can be shoved as fast as they are emptied and shaken out. At convenient intervals this box should be unlocked, and the contents checked against the number of bags used.

Another method is to use a holder attached to the frame of the mixer near the loading hopper. When 50 sacks have been piled in this holder, they are tied in a bundle and carefully stored until shipment is to be made.

The sack bundling device illustrated can be readily made by the contractor. Fifty sacks are counted into the rack with two wires running under the pile and one long wire running lengthwise on top of it. One end of the steel bar is run through an eye bolt and attached to the other end to a hook. The two short wires then are tied over the sacks, thus doubling them over the long wire. The bundle then is released by withdrawing the bar, after which the long wire is brought around the ends and a hitch taken with it around the other wires. The long wire then is brought around the middle of the sacks and tightly tied.

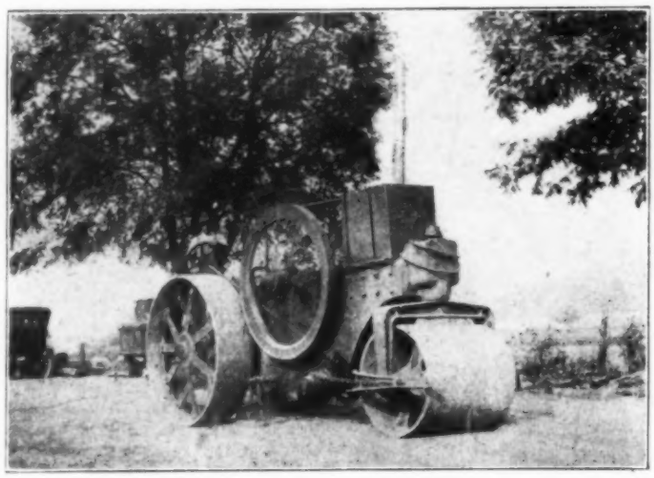


OBTAINING PUBLIC CONTRACTS

A Discussion of What Must Be Done to Procure Them

By Daniel J. Hauer, C. E.
Construction Economist.

IT would seem that little advice could be given in regard to obtaining public contracts. But new contractors are continually coming into the field. There also are many older men, who, although experienced in obtaining and handling private contracts, have had no experience in obtaining public ones. With little railroad and similar construction going on, many large construction companies now must turn to road building, municipal construction and other public work. If they are to succeed in such work contractors must have intimate knowledge of how public contracts can be obtained and the need of conforming to the conditions of public lettings.



A ROLLER ON THE JOB.

Under most conditions the law compels the advertising of public lettings, but this does not mean that much publicity will be given to a project. For instance, a county of some state may have a single road contract of $250,000 and a small "ad" may be run in the weekly county paper with a limited circulation, and only a few contractors may hear of the project. County road work is considered by many to be just as desirable as state road work, so it is well worth going after.

Thus, the first thing necessary is to learn of the opportunity to bid. In cases like the one cited, there is one method of keeping posted. Although little publicity may be given to advertising the work, yet much more advertising will be done for the sale of the bonds. Consequently, bond sales for public improvements should be watched and followed up by using a card index and follow-up filing system. If information is obtained of especially desirable jobs that are to be done with the money obtained from bond sales, and if it is customary to advertise only in the county papers, subscription to such papers can be made and the jobs watched in that way. Twenty to thirty dollars spent in a year for such weekly papers may prove a good investment. Appropriations for public work can be followed up in this manner, for appropriations frequently are made from regular tax money, as well as from bond issues.

City newspapers also must be watched for bond sales, advertisements of public work and appropriations. Contractors who are willing to go away from home and do work in half a dozen or more states will find it advantageous to be subscribers to daily papers from half a dozen or more cities. This, too, will be an investment that will pay well.

Many important contracts let by the national, state, city and county governments, as well as by many small towns, boroughs, townships and villages are now advertised in the national engineering and contracting journals and also in some of the trade papers. A contractor who does not take a number of these papers and read them over carefully makes a great mistake. The writer counts himself fortunate in having more than fifteen such papers in his files. Another method of keeping posted on the letting of public contracts is to subscribe to daily reports of reporting bureaus or construction supplements. Such reports may cost from twenty-five to one hundred dollars per year, but some contractors have used them to great advantage.

Opportunity to bid on public work sometimes can be obtained by sending a card or letter to public works engineers and department heads so that the contractor's address is at hand, thus allowing notices and reprints of advertisements to be mailed to him. This is cheap and at times effective.

Judicious advertising by letters, either personal ones or circular letters got up to resemble personal letters, can be done among engineers and public officials. These letters should be carefully worded, calling attention to the contractor's organization, his equipment, capital, and his experience along the line of work he has done or is seeking. Thus, public jobs may be mentioned and even photographs sent. If any papers have published accounts of jobs done by the contractor, reference can be made to the pages and issue of the journals. Better still, reprints can be made of such articles and copies enclosed. This kind of advertising fastens the contractor's name in the minds of those whom he wishes to reach and prejudices them in his favor even before he bids. Letters sent around to public officials asking information from them are a help in advertising. Thus a contractor building roads can ask about the life of a certain class of roads, or, if the official is using some special machine, or specifying some particular finish on his road. These things introduce a contractor to those who have work to let.

With the information obtained of a public contract to be let, the contractor must now qualify to bid. In the November issue of Successful Methods appeared an article as to financial statements and standing of contractors and the reader is referred to that article for information as to the necessary qualifications from the financial standpoint.

The next is to qualify by experience. One specification reads: "Bidders must present satisfactory evidence that they have been regularly engaged in the line of work they propose to do, or are reasonably familiar therewith and that they are fully prepared with the necessary cap-

ital, material and machinery to conduct the work for which they propose to contract to the satisfaction of the engineer."

Another contract provides that a bidder must be prepared to take one or two representatives of the engineer to visit one or more jobs of similar work that he has previously done.

Thus a contractor must show experience in the line of construction proposed. This can be done by showing work he has accomplished as an engineer, foreman or superintendent, if he is just starting out as a contractor, or if he has been engaged in business for himself, by his own jobs. Should he be entering a new line, then he must have associates, either as partners, engineers, superintendents or foremen, who are experienced in these lines. In some cases it even has been necessary to organize a company in order to have it qualify for certain work and some companies even have been known to reorganize in order to obtain valuable contracts.

Much can be accomplished in this connection by advertising in papers and by letters and circulars, thus showing to engineers and public officials that you are qualified in many respects to do almost any kind of construction.

The next consideration is the making out of proposals or bids for public contracts. The actual making up of the estimate is a matter that must be discussed in another article, as space will not permit it at this time, but a proposal must be formal in every respect.

This means that a bid must be made out on a regular proposal form or blank or in the book of contracts and specifications if the form is bound with them. If the specifications provide that the proposal must be in duplicate or triplicate, this must be done. Otherwise, the proposal will be rejected. If the prices must also be written, as well as put down in figures, the proposal may be rejected if this is not done. Even to omit a single price on one item in a proposal is risking disaster. If a contractor feels that the price on one item will cover that on another, he should mark in the proposal 00 cents or else name a price of one cent or a fraction of a cent. This is formal and legal.

A GRADER GETS INTO THE MOVIES.

The unit of work or the items set forth should never be changed. Nor should lump sum prices be substituted for unit prices or vice versa. Nor should alternate bids be listed in the regular proposal. It is even advisable to see that all punctuation is correct and that words are properly inserted and spelled correctly. If dates are called for they should be inserted at the proper places. All instructions and directions for making up proposals should be read and followed.

In signing a proposal great care must be exercised to make the signature strictly as the form provides. For a partnership the name of each partner with his address may have to be given and for a corporation the name and addresses of certain officials that are specified, and possibly the seal of the corporation must be affixed.

This usually must be followed by sealing the proposal. In some cases envelopes are furnished for this purpose, but if they are not, the contractor should purchase envelopes of the proper size and the outside should be addressed as per instructions. If necessary, the envelopes should be marked showing their contents as per instructions, as for example, "Proposal of the Good Roads Construction Company for Contract R3 for Concrete Roads in Caroline county."

It is not advisable to use an envelope with the printed address of the contractor on it, for some objection may be made by a competitor and under the law the proposal may have to be thrown out as informal.

All proposals should be delivered to the proper official on time, either in person (preferred) or by registered mail, obtaining a return receipt to show it was received before the time limit on the proposal. If a proposal is delivered after the specified time, no official has a right to receive it or consider it. Court decisions are against the acceptance of such proposals.

In obtaining public contracts care must be exercised to fulfill the specifications and instructions as to showing the responsibility of the bidder by furnishing a bidding bond or accompanying the proposal with a certified check. The proposal bond is the best form for a contractor, but it can be used only when it is specified or permitted. A certified check may be for a specified or a flat amount or a certain per cent of the contractor's bid. In some cases, the check must be upon a bank within the limits of the state in which the proposed work is located, or upon a bank, member of the clearing house of a certain city. If this is specified the contractor must arrange for such a check with his bank in ample time to procure it and enclose it as per instructions with his proposal. Generally the check or bond is enclosed with the bid, but in some cases it must be in a separate envelope or container.

For some public contracts it is necessary to fill in on the proposal form the bondsmen the contractor will furnish if the contractor is awarded the work. When this is necessary it is generally provided that the bid must be accompanied by a letter or certificate from the bonding company that it will furnish the necessary bond. Without this the proposal cannot be considered. Bonding companies may take several days to furnish such certificates so this provision must be known in ample time to make the necessary arrangements.

Thus, it can be seen that there are many things that must be done to obtain public contracts and the contractor who has been engaged upon work for private corporations only must be posted as to all of these details if he expects to succeed in the public contract field.

GOOD INSPECTORS—YES, YOU CAN FIND THEM

If You Will Look for Them Carefully

By L. G. Vose
Superintendent, Eastport Electric Light Co., Eastport, Maine.

YEARS ago inspectors were unknown. Their services were not required. Why? Every man from the boss down to the water boy was doing his best and the work invariably stood the test, the only practical test, the test of time.

One illustration, a dike a quarter of a mile long, withstood the storms for ninety years, reclaiming many acres of marsh land. One day the automatic gates which held the tidewater and allowed the brooks to run free, failed in their duty and the rush of water carried away the wooden frame weakened with age.

An engineer was called and after considerable figuring allowed the damage could be repaired for so much money. The money was expended. The job failed. Another engineer was called. He also failed. So much money was expended that the owners of the land lost faith and would not appropriate more funds.

Don't you believe the dike could have been repaired and made as good as when placed there by workmen 100 years back? Of course it could. The engineer simply figured too fine. He tried to make the job good for ten years or less, instead of for one hundred. A little slight here and there (inefficient contractors call it saving) covered up with plaster, paint or putty perhaps, often gets by. They have to do it. They bid low to knock the other fellow.

For these reasons the inspector is with us and is here to stay so long as we have contract work.

Often bids are accepted from a financial standpoint alone, by officials who haven't the slightest idea of value received. When the job is on, these public men are too busy to follow up their contract. They appoint an inspector. They use the same judgment as before. Mr. Inspector is possibly a good sport in hard luck. He is in with the bunch. They help him along. He is not consulted, not even thought of until the contract is closed. He is up against it from the start. You can guess the rest. The parties responsible get out from under. Poor Mr. Inspector learns his lesson. Never again for him. But there is another victim waiting: the public has to settle.

Now then, what can be done to better conditions? Simply this:

Select your inspector first, and be careful in your selection.

He is in your town if you will take the trouble to find him.

He is between forty and fifty years of age. He has made his home with you 10 or 15 years.

He is interested in public affairs, though he is not especially keen about politics. He may or may not be a church member, but his standing and character are excelled by none.

He believes in right and in the square deal for all.

And, most important, he is mechanically inclined, not necessarily an engineer, preferably having a mechanical trade.

His services are yours for a small sum because he is interested.

Mr. Committeeman, find this man for your next contract. Consult with him before closing it. You will marvel at results. And you, Mr. Contractor, have a real pleasure awaiting you.

LIEUT. COL. STOVEL JOINS CONSTRUCTION COMPANY

ANNOUNCEMENT is made by the Westinghouse, Church, Kerr & Co., of the appointment of Russell W. Stovel as consulting engineer of the company. He will devote his entire time to electrical and mechanical work.

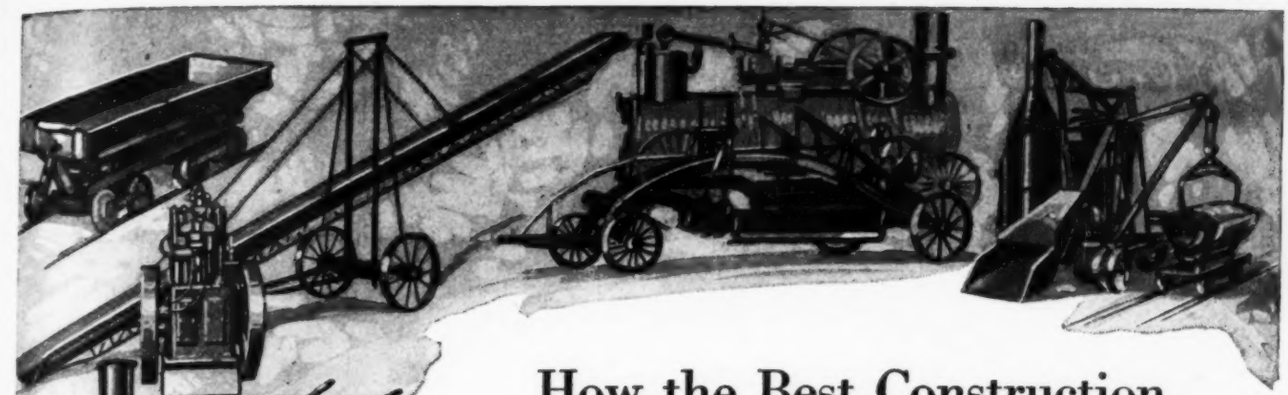
Mr. Stovel has just returned from France, where as Lieutenant-Colonel of Engineers, he served as Chief of the Terminal Facilities Division of the Army Transport Service.

Following his graduation from McGill University in 1897, he was employed by the Westinghouse, Church, Kerr & Co. as an assistant engineer, finally rising to the grade of managing engineer. During the period of his service with the company, he handled a number of important jobs, among them being the design and construction of the power plants for the Utah Light & Railway Company, Salt Lake City, Utah; the Meriden Light & Railway Company, Meriden, Conn., and the Edison Electric Illuminating Company, York, Pa.; the design and construction of passenger terminal and steamboat pier for the Canadian Pacific Railway, Vancouver, B. C.; the design of proposed power station for the Pennsylvania Railroad at Harrison, N. J.; design of extension to power plant for New York, New Haven & Hartford Railroad at Cos Cob, Conn.; design and construction of power plant at Wabash Pittsburgh terminal, Pittsburgh, Pa., and the design and construction of the machine shop for the Chicago Railway Equipment Co., at Chicago.

LT.-COL. RUSSELL W. STOVEL

In 1914 Mr. Stovel became managing engineer for Gilles & Hill, consulting engineers of New York, and while working in that capacity had charge of the Paoli and Chestnut Hill electrifications of the Pennsylvania railroad; the Elkhorn Grade electrification of the Norfolk & Western Railway and the electrification of the New York Connecting Railway, which crosses the big Hell Gate Bridge.

Mr. Stovel's work in France included the providing of adequate facilities to permit the discharge of the 100,000 tons a day necessary to meet the needs of an army of 4,000,000 men.



How the Best Construction Machinery is Placed Before All Users

The Same Service Abroad as at Home

USERS of construction machinery abroad can get through our organization the same advice and service that is available to buyers in the United States.

The men in our branch offices have the experience which qualifies them to act as your machinery experts.

Those men are backed by the engineers and the products of a group of the most reliable manufacturers in the United States. This group includes all of those whose advertising appears in this publication.

ALLIED MACHINERY COMPANY OF AMERICA

Cable Address: ALMACOA

51 Chambers Street, NEW YORK

BRANCH OFFICES.

ARGENTINA—Venezuela 691 Buenos Aires. J. A. Cordeal. Cable Address: ALMACOA.

AUSTRALIA—76 Pitt Street, Sydney. A. N. Herrick. Cable Address: CONALMAC.

BELGIUM—34 and 36 Rue Melsens, Brussells. Allied Machinery Co. of America. Cable Address: ALMACOA.

BRAZIL—90-92 Rua Sao Pedro, Rio de Janeiro. Oscar Taves & Co. Cable Address: ARAMPO.

BRAZIL—Sau Paulo—Byington & Co., Cable Address: ALTON.

CHILE—Iquique. Allied Machinery Co. of America. Cable Address: ALMACOA.

CHILE—Calle Bandera, 780 Santiago. Allied Machinery Co. of America. Cable Address: ALMACOA.

CUBA—Havana. Allied Machinery Co. of America. Obrapia 23, Cable Address: ALMACOA.

ENGLAND—Allied Machinery Co., Ltd., 122 Queen Victoria Street, London, E. C. 4. Cable Address: ALYDMACHIN.

FRANCE—Paris. Allied Machinery Co. de France, 19 Rue de Rozroy. Cable Address: ALMACOA.

INDIA—Karachi. L. R. Vinall-Moon. Cable Address: ALMACOA.

ITALY—Turin. Allied Machinery Co., Corso Dante 40. Cable Address: ALMACOA.

JAPAN—Tokyo. Horne Company Ltd., 67 Takiyama cho, Kyobashi-ku. Cable Address: HORNE.

PERU—Lima. Cor. Ortiz & Colonge Sts. Representative, Joaquin M. de Uriarte, Engineer.

PORTUGAL—Rua de Alecrim, 10 Lisbon, Monteiro Gomes Ltd. Cable Address: TRACTORS.

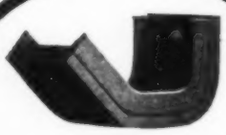
SPAIN—Barcelona. Plaza de Calaluna 8. Allied Machinery Co. de Espana. Cable Address: ALMACOA.

Sterling STERLING ON A WHEELBARROW MEANS

At These Six Points Comes 90% of Wheelbarrow Wear

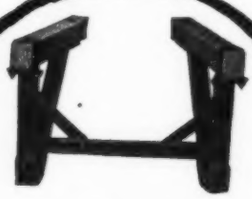
Handles Clamped On

No bolt holes in the handles to weaken them. Here's added strength at the point of greatest strain. Sterling construction again.



This Broad Flat Leg Bearing With Extra Steel Shoe

Heavy Channel Iron Construction. Lasts indefinitely. Never wears through as do usual pointed legs.



Rivets vs. Stove Bolts

Sterling Riveted leg construction cannot work loose. Stove bolts on ordinary wheelbarrows a constant source of trouble.

Sterling Wheelbarrow Company

NEW YORK BOSTON CLEVELAND MILWAUKEE, WIS. DETROIT CHICAGO ST. LOUIS

EXPORT DEPARTMENT ALMACOA ALLIED MACHINERY COMPANY OF AMERICA ALMACOA

MORE THAN STERLING ON SILVER Sterling

Why Sterling Wheelbarrows Outlast All Others

IT'S time for wheelbarrow buyers to know wheelbarrows—to know why some fall to pieces at the start of the job; why some — Sterling made—last and last until they pay their way twice over.

Study wheelbarrows, please. Let your own experience point out where and why and how most of them show weakness. Then note these six exclusive Sterling features. And note as well what has prompted everyone of them.

No fancy fixings here. Solid, substantial construction—*great extra strength at just those places where trouble usually comes.*

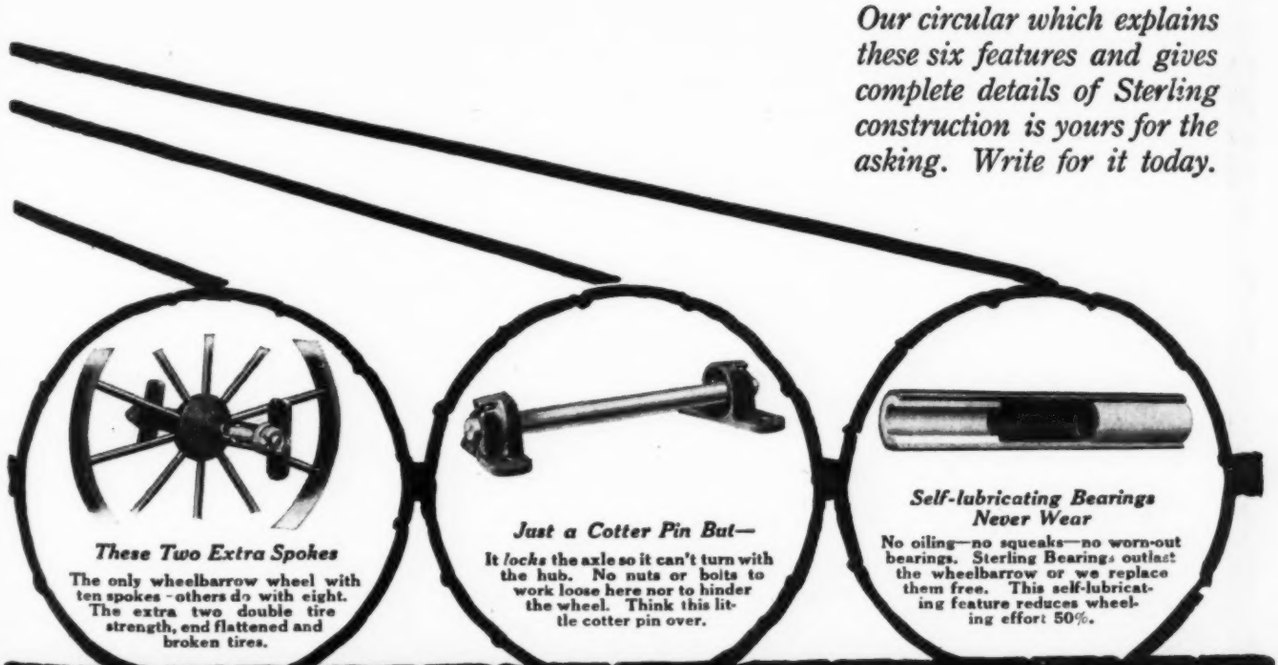
Take the ten-spoke wheel. How many flattened or broken tires it saves!

Or the *flat* leg bearing, reinforced that give the wheelbarrow a firm footing and a real surface (not a point) to stand the wear.

Or the self-lubricating bearing we include to speed up wheeling. Take each of these Sterling Features—figure what they mean in dollars and cents to you.

Remember there's more to wheelbarrows than their price—ask us for the Sterling story.

Our circular which explains these six features and gives complete details of Sterling construction is yours for the asking. Write for it today.



These Two Extra Spokes

The only wheelbarrow wheel with ten spokes - others do with eight. The extra two double tire strength, end flattened and broken tires.

Just a Cotter Pin But—

It *locks* the axle so it can't turn with the hub. No nuts or bolts to work loose here nor to hinder the wheel. Think this little cotter pin over.

Self-lubricating Bearings Never Wear

No oiling—no squeaks—no worn-out bearings. Sterling Bearings outlast the wheelbarrow or we replace them free. This self-lubricating feature reduces wheeling effort 50%.

Sterling Wheelbarrow Company

NEW YORK
BOSTON
CLEVELAND

MILWAUKEE, WIS.

CANADIAN AGENTS MUSSENS LIMITED MONTREAL, TORONTO, WINNIPEG, VANCOUVER

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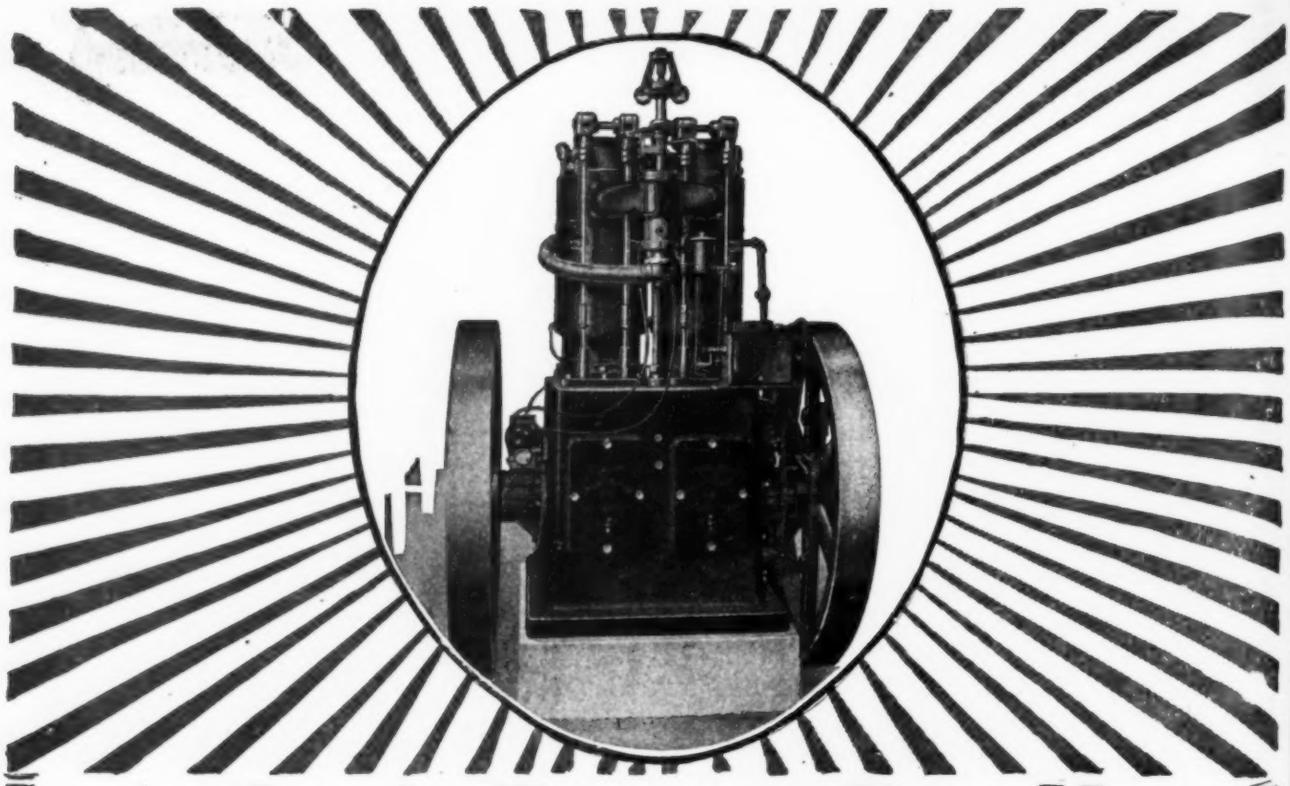

A Cook Engine For You

Some Reasons Why

ENGINE USERS—whether you buy the engine itself, or the machine it runs—mark these facts. They're but a few of the reasons for Cook Engines—only a few of the points which give it supremacy.

For one thing it is one engine you can absolutely rely upon to give reliable, continuous service; to operate at a high degree of efficiency even under the most adverse conditions.

This is because of the remarkable simplicity of design. We have eliminated every unnecessary part and reduced to a minimum the number of cams, gears, etc. All this without impairing the efficiency; in fact, increasing it because of the freedom from trouble.

Every part is accessible without tearing down your engine or removing adjacent parts.

Cook Engines are absolutely dependable—the engine for you.

Sizes from 12 to 40 h.p. in both single and double cylinder types.

Write for detailed specifications and full information.

These Features Assure Cook Performance

Mechanical force feed lubrication.
High Tension Magneto with Impulse Starter.
Ball Governor type regulation giving a flexibility heretofore considered impossible in an internal combustion engine.
Hammer forged open hearth steel crank shafts.
Cut Steel Gears.
Genuine Babbitt and Phospor Bronze bearings throughout.
Adjustment feature for all important bearings to take up wear, etc., etc.

The Cook Motor Company, Delaware, Ohio, U. S. A.

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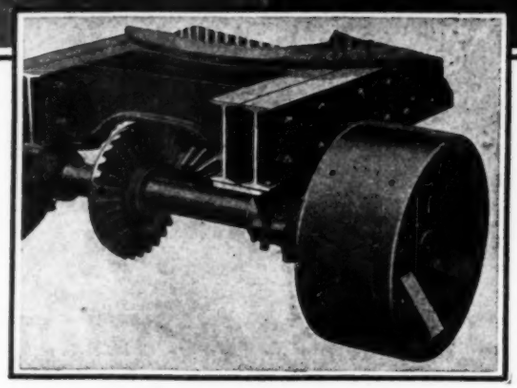
31 Chambers St. New York U.S.A. Cables Almacoa New York



The Best of 1800 Thews

and many new features are built into

This New Type O

During the 26 years that Thews have served contractors Thew has always led in developing new features so that contractors would have a more efficient machine. The success of this 26 years of effort is evidenced by the large number of contractors who use Thews exclusively and by the large number of 10- and 15-year old Thews still giving satisfactory service. The new Type O incorporates all the good features of 1800 Thews and has a dozen or more new ones.

The New Type O has

cut steel gears, wheels that can't damage pavements, steam ram, increased travel power, interchangeable power units and equipment, greater strength throughout, larger swing and crowd engines, greater stability—and a dozen other features of importance to you.

Thew reliability, efficiency and experience will prove that you buy best when you buy a Thew. You'll say so too when you see the new Type O. Details? By return mail?

THE THEW AUTOMATIC SHOVEL COMPANY
LORAIN, OHIO

New York: 30 Church Street Chicago: Monadnock Block

Cut Gears Reduce Friction Losses and Insure Perfect Parts

All gears on the new Type O Thew have cut teeth, with two minor exceptions.

Cutting the teeth in a few gears solves but a part of the problem. Hence both bevel and spur gears are cut, preference being given to the bevels on account of the class of service demanded. For this reason Thew gears work smoothly and with minimum friction losses right from the start.

Machining the gears exposes defects in the castings, thus insuring, on Thews, as nearly perfect gears as it is possible to produce.

This care and precision in the manufacture of gears and all other parts of the new Type O Thew gives you maximum assurance that you buy best when you buy a Thew.

Thew manufactures a complete line of revolving shovels and cranes—steam, gasoline and electric. Dipper capacities ½ to 2 cubic yards. Cranes 3 to 7½ tons capacity.

THEW Power Shovels

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ALMACOA ALLIED MACHINERY COMPANY OF AMERICA ALMACOA
51 Chambers St. New York, U.S.A. Cables: Almacoa New York

Two dollars a minute

THE excavating value of a large revolving shovel, when loading Western Air Dump Cars on Mesaba Iron Range, is ***Two Dollars a Minute,*** according to engineers of the U. S. Steel Corporation.

A Dollar a Minute, they say, is a conservative valuation of a 4-yard steam shovel's time, figured on a production basis as it ought to be figured.

That is why for heavy work the Steel Corporation, the United Verde, the Copper Queen, and other mining companies are installing Western Air Dump Cars of larger and larger capacity.

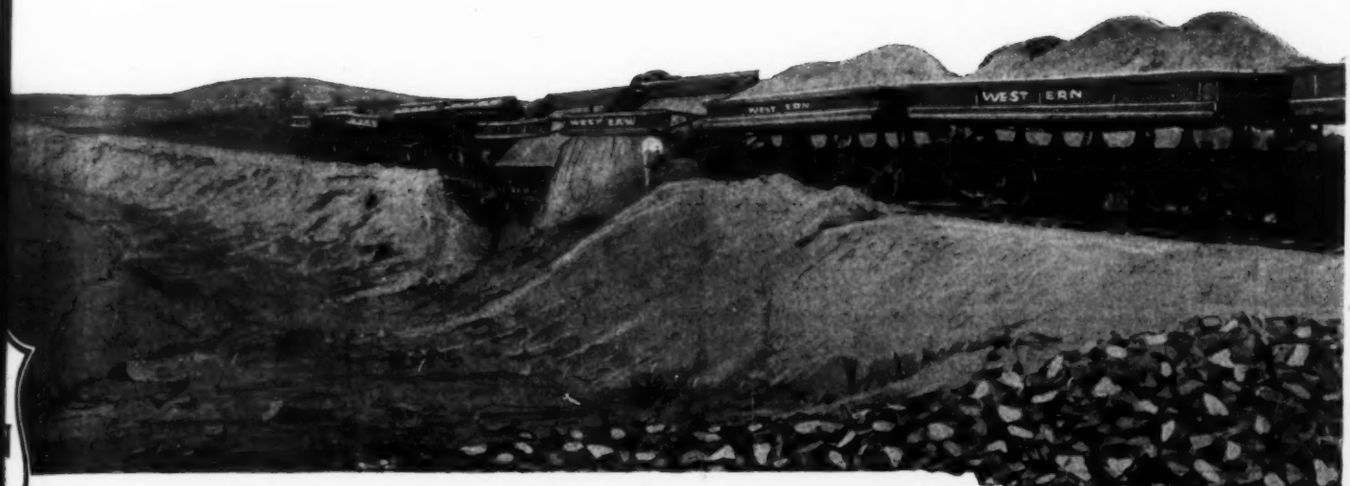
The shovels must be kept busy

A shovel delay of only ten minutes at the United Verde, or on the Mesaba Range, waiting for dump cars, would mean a production loss of $10.00 to $20.00, depending on the size of the shovel.

The answer is Western Air Dump Cars and plenty of them. Dump Cars, not your shovel, determine your yardage moved and your profit.

Your dump cars must be able to stand up under heavy work. They must hurry back to wait for the shovel, instead of making the shovel wait for them. ***They must be on the job every two dollar-minute.***

Western Wheeled



...n't throw them away

WESTERN Air Dump Cars, in the largest sizes, solve the problem of "how to keep the shovel busy." They are designed and built to stand the strain of heavy work, of the best quality of material and workmanship. They are designed and built to run in safety at high speed; to dump quickly and get back to the shovel.

They have a steep dumping angle and large discharge opening; also an air dumping device which gives ***34 per cent greater dumping power*** (and correspondingly greater dumping speed), with no greater consumption of air, than any other make of air dump cars on the market.

In heavy excavation of all kinds, Western Air Dump Cars are the key to production, for they will keep the shovels busy and themselves keep out of the repair shop.

The construction field is entering a big year. Look up the question of car equipment NOW, not next Spring.

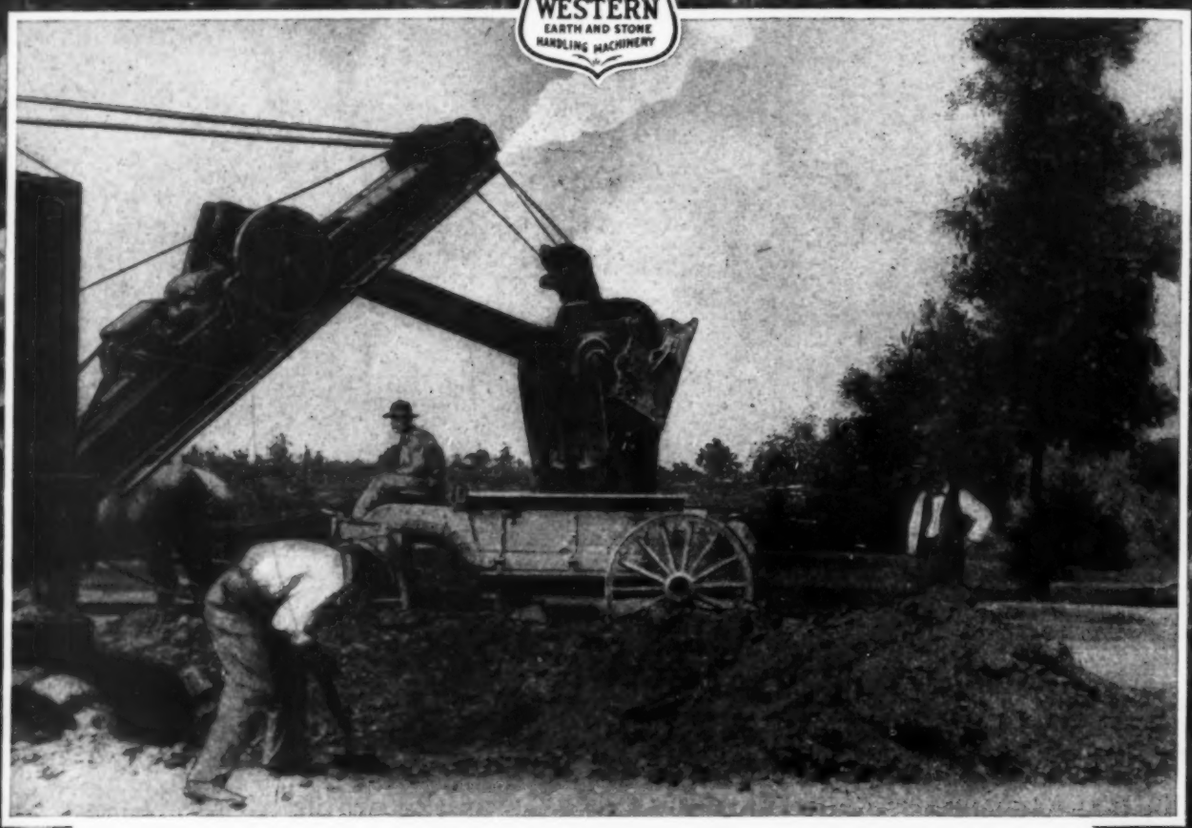
WRITE TODAY for facts and figures about the latest types of Western Air Dump Cars. Two Dollars a Minute may be the price of delay, later.

Western Air Dump Cars are made in 12, 16, 20, 25, and 30-cu. yard sizes.

...er Company AURORA ILLINOIS, U. S. A.

WESTERN Of Course

THE BEST THE WORLD PRODUCES
WESTERN
EARTH AND STONE HANDLING MACHINERY



"WHAT wagons am I using? Why, Western, of course. I wouldn't have any other on the job."

Many contractors will tell you that. It is not that there are not other wagons which might be used and sometimes are used when Western Wagons are not obtainable; it is because Western Dump Wagons, like all other Western equipment, are absolutely dependable, will wear for years and are easy on the stock. It doesn't pay to wear out good mules hauling wagons that are heavier than necessary and imperfectly designed.

A Few Points of Western Superiority

The Western Dump Wagon combines lightness with strength.

The bed is made of Washington fir, light and strong—reinforced with steel where the strain is greatest.

The dump opening is large enough to permit two yards of dirt to be dumped in one place without coming in contact with the wagon body. It is designed and built for light running.

The king-bolt is provided with a joint, maintaining the bed in balance although on uneven ground.

Easily and instantly dumped by the driver, with hand or foot, without stopping the team.

Compared with old-style dump boards, Western Dump Wagons will quickly save their cost.

NOW is the time to arrange for your wagon equipment. Western dump wagons are standard and you will need wagons on those road jobs in the spring.

Send for Illustrated Catalog

Western Wheeled Scraper Company

Earth and Stone Moving Machinery

Aurora, Illinois, U. S. A.

Founded 1877

EXPORT DEPARTMENT
ALMACOA ALLIED MACHINERY COMPANY OF AMERICA ALMACOA

Worth Its Cost Ten Times Over

When You're On that "Way-Out" Job

If there's one part of a road builder's equipment that is really indispensable it's this Farquhar Steel Tank Wagon. You know how some jobs take you far away from a water supply or from your own base. Think how much time and money and grief this tank saves you on jobs like this. You can haul it behind your traction engine, or your roller, it's suitable for use with either, and it pays with either.

The Farquhar Steel Tank Wagon

for hauling water or gasoline

Not only on the far away job, but nearly every day this tank is of service, and it hauls water or gasoline. Convert it into a sprinkler (at only a slight expense) if you wish. Write for our Steam and Gas Tractor catalog which tells you in detail about this profit-making tank for road builders, also fully describes and illustrates Farquhar Steam Road Engines.

A. B. FARQUHAR CO., Ltd., York, Pa.

New York City
Albany, N. Y.
Trenton, N. J.

Petersburg, Va.
Atlanta, Ga.
Jacksonville, Fla.

New Orleans, La.
Los Angeles, Cal.
St. Louis, Mo.

Grand Rapids, Mich.
Salt Lake City, Utah
Portland, Ore.

EXPORT DEPARTMENT
ALMACOA ALLIED MACHINERY COMPANY OF AMERICA ALMACOA

This "Two-Blow-Stroke" Crusher Increases Production with Minimum Vibration

Aurora Crusher on Trucks

What the "Two-Blow-Stroke" Means

Here's a crusher — The Aurora — with a stroke entirely different from any other jaw crusher.

It's a powerful movement — it doubles the blow on the rock for every revolution of the crankshaft, thus increasing production with minimum vibration.

Wearing parts are reduced to a minimum — toggle plates and springs (familiar in the ordinary type of crusher) are done away with entirely.

The Aurora Crusher is portable — mounted on trucks (shown above) or on skids.

It has a remarkable performance record — facts are ready. Write at once for full information.

The Austin-Western Road Machinery Co.
CHICAGO, ILLINOIS

New York	Richmond	New Orleans	St. Paul	San Francisco
Albany	Charleston	Jackson	Memphis	Los Angeles
Boston	Columbus	Dallas	Nashville	Portland
Philadelphia	Louisville	Oklahoma City	Atlanta	

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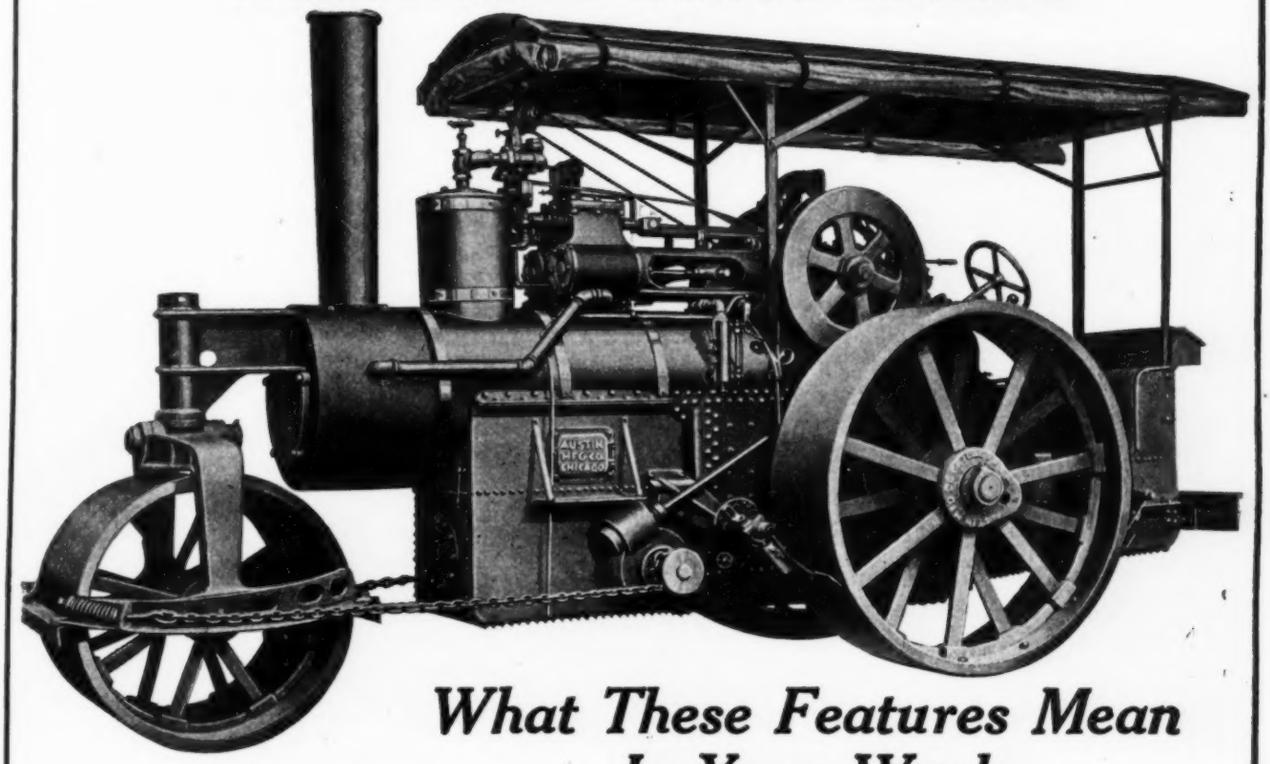
ALMACOA ALLIED MACHINERY COMPANY OF AMERICA ALMACOA
51 Chambers St., New York, U.S.A. Cables: Almacoa New York

More Steam Space and Heating Area With Austin Steam Rollers

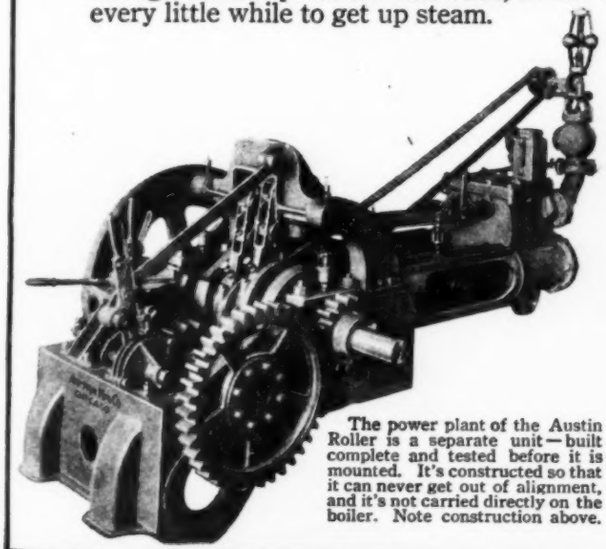


What These Features Mean In Your Work

Users of Steam Rollers—note these two salient features—they're the "reasons why" for the remarkable performance records of Austin Steam Rollers.

Take the question of heating area. Actual figures show that Austin has about 30% more than the average of all other standard steam rollers. Then note the bigger boiler—and the extra large steam dome to store up power.

These explain why you get steam quicker with Austin and get more of it—enough steam quick for hill-work, or for the heaviest jobs. And you don't have to stop every little while to get up steam.



The power plant of the Austin Roller is a separate unit—built complete and tested before it is mounted. It's constructed so that it can never get out of alignment, and it's not carried directly on the boiler. Note construction above.

Other Important Features

Remember, please, that Austin Rollers have no stud holes or bolts in the boiler to leak steam. And the accessibility of the flues for cleaning; the larger transmission bearings; the wider, stronger gears—and many other features of greatest importance.

Write for all the details. Ask for catalog.

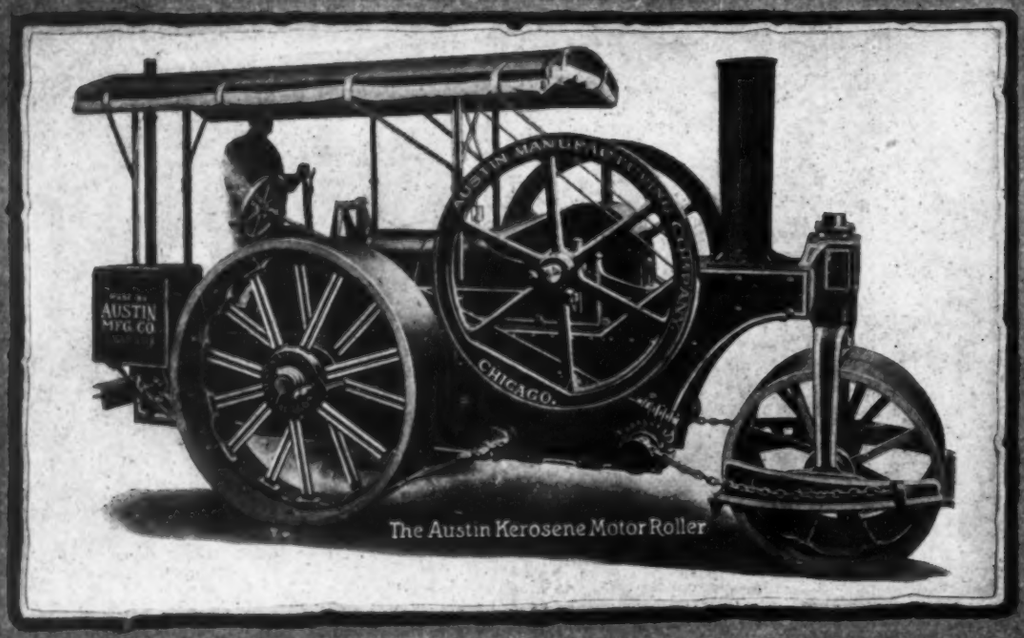
The Austin-Western Road Machinery Co.

CHICAGO - ILLINOIS

New York	Philadelphia	Nashville	Los Angeles
Albany	St. Paul	Atlanta	New Orleans
Dallas	Memphis	Columbus	Jackson
Oklahoma City	Richmond	Louisville	Portland
Boston	Charleston	San Francisco	

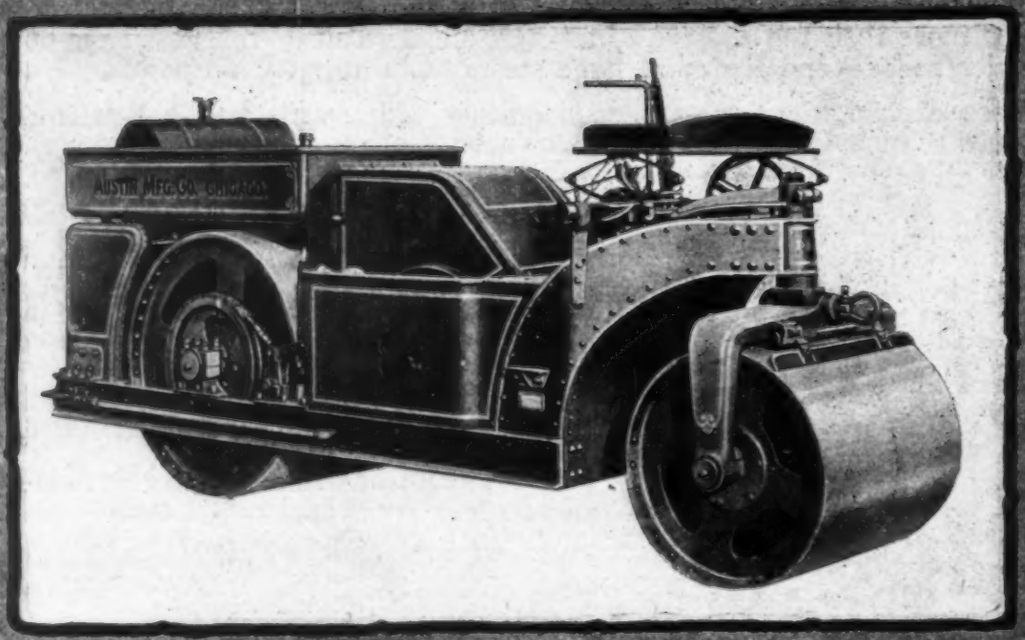
EXPORT DEPARTMENT
ALMACOA ALLIED MACHINERY COMPANY OF AMERICA ALMACOA

Two Types of Austin Motor Rollers



The Austin Kerosene Motor Roller

3 Wheeled and Tandem



Between Them They Handle Every Road Rolling Job

HERE are two members of the Austin family of road making machinery, the two types of motor rollers. You'll find one or the other building roads the world over. You'll find as well on every job you have, you need one—or the other. They are the indispensable friends for all who build roads or repair them.

The 3-Wheeled Type

Made in five sizes, 7 to 15 tons. Two speeds—steel gearings—practical self-starting device—simple ignition, no coils or batteries.

Austin Tandem Rollers

The paving contractor's "first aid to profits." Steady running—low center of gravity yet with high road clearance—easily controlled—power steering—low operating cost.

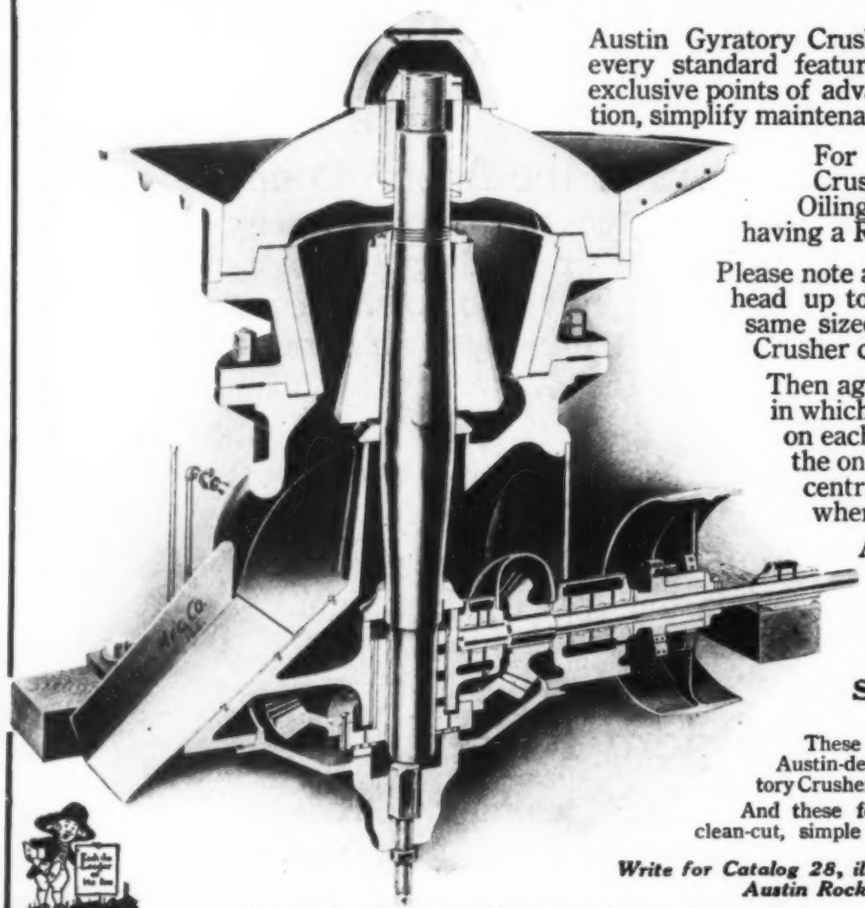
Both types are fully described and illustrated in our Motor Rolling Catalog which also contains complete specifications. Write at once for your copy.

THE AUSTIN-WESTERN ROAD MACHINERY CO.
Chicago Illinois

NEW YORK	BOSTON	RICHMOND	COLUMBUS	NEW ORLEANS
ALBANY	PHILADELPHIA	CHARLESTON	LOUISVILLE	JACKSON
DALLAS	ST. PAUL	NASHVILLE	SAN FRANCISCO	PORTLAND
OKLAHOMA CITY	MEMPHIS	ATLANTA	LOS ANGELES	

EXPORT DEPARTMENT
ALMACOA ALLIED MACHINERY COMPANY OF AMERICA ALMACOA

Six Exclusive Features in This Austin Gyratory Crusher



Austin Gyratory Crushers, in addition to possessing every standard feature of construction, have six exclusive points of advantage which increase production, simplify maintenance and cut costs to the bone.

For one thing, this is the only Crusher which has an Automatic Oiling System. Also the only one having a Rigid Eccentric Bearing.

Please note as well that after adjusting the head up to the limit, it will receive the same sized rock, — something no other Crusher can do.

Then again — it is the Only Crusher in which the counter-shaft is supported on each side of driving pinion. And the only one in which the full eccentric bearing surface is retained when the head is raised.

And here's another very important point—The Austin Gyratory Crusher is the only one thorouughly protected from dust and dirt.

Study This Internal Construction

These six important points are exclusively Austin-devised and designed to place this Gyratory Crusher first among rock crushing equipment. And these features have done this. Note the clean-cut, simple construction shown at the left.

Write for Catalog 28, illustrating and fully describing Austin Rock Crushing Equipment

Austin Manufacturing Company

New York Chicago San Francisco

Canadian Agents: Mussens, Limited, Montreal, Toronto, Winnipeg, Vancouver

Austin Municipal Revolving Screen

Another piece of Austin Rock Crushing Equipment described in our handsome catalog. Be sure to get this book. It's full to the brim with interesting information for rock crushers.